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ABSTRACT

A collection of working papers from the course design process of two education courses is presented with attention focused on the category systems employed to set out course objectives and methods. The two studies illustrate the use of a grid to establish the relationships between various course objectives. The first collection of papers is based on a one-year postgraduate course offered at King's College in London for biologists intending to teach secondary school. Included in the documents are: a proposed overall pattern of the graduate training year; a suggested analysis for training and educating graduate biologists to enter the teaching profession; a discussion of the philosophy of the curriculum, role of the teacher, course content, classroom techniques, integration of content and techniques, organization and administration, and student performance. Appended are papers entitled: Assessment of Student Teachers, Assessment of Final Teaching Practice, Why Do I Wish to Teach?, and Biology Method. The second case study illustrates the planning and design of a course for teachers of general medical practice. An analysis of the course objectives, activities, and assessment is provided. It is suggested that these two studies will provide valuable information for those interested in the course design process. (SP)

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Studies in Course Design
Volume 1

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Dorothy Dallas
David Warren Piper
Roy Cox and
Seppo Kontianen

HE 012 255

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Studies in Course Design
Volume 1

Case Study I:
One Year Postgraduate Course in Teaching
for Biology Graduates

Case Study II:
A Course for Teachers in General
Medical Practice

UTMU
University Teaching Methods Unit

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Contributors

DOROTHY DALLAS has been involved in the training of graduates in Biological Sciences for teaching at the Faculty of Education, King's College, London, for the last ten years. She has contributed work on human biology and interdisciplinary methods in sex education to the Nuffield Secondary Science and Revised Nuffield 'O' level Biology projects; she is also the author of 'Sex Education in School and Society' for NFER. Being one of those who feeld a sense of security when putting things into tables, columns and boxes, she adopted this method in an analytical survey of her aims in teacher education and her methods of implementation.

DAVID WARREN PIPER is the Head of the University of London Teaching Methods Unit and is widely involved in the areas of improving teaching and course design. His career has been varied including teaching in an art college, and in a university management school. He is involved in a number of consultancy projects in fields related to course design, and has run such activities in a number of Arabic and Latin American countries. Among a number of publications are 'Readings in Art and Design Education - Vols I and II' and 'The Changing University' a major report on staff development in British universities (in preparation).

ROY COX studied philosophy and psychology at Edinburgh University and went on to research in these fields in Cambridge. After returning to Edinburgh in 1960 he later joined the University of Essex , eventually joining UTMU in 1970. He has been concerned with all aspects of the Unit's work, but particularly with assessment, students, small group teaching and the evaluation of teaching. Apart from UTMU his teaching experience has been mainly with Essex, the Institute of Education in London, and the WEA. He has published a monograph, edited books and written numerous articles on teaching, student assessment and evaluation.

SEPPO KONTIAINEN studied psychology and education at Helsinki University and carried out research on education mainly concerned with student perceptions of the behaviour of their teaching practice supervisors. He is at present assistant professor at the Institute of Education at Helsinki and in 1972/3 spent two years with UTMU working particularly on the evaluation project concerned with a course for teachers in general practice. In 1976 he will return to UTMU as an Honorary Research Associate and British Council Scholar.

Abstract

This is the first of two volumes which contain three case studies, illustrating in detail the process of designing a course. This first volume contains two studies which have been chosen because they illustrate the use of a grid to set out the relationships between various course objectives. The second volume contains one case study which illustrates a series of steps which lead from a first crude statement of course objectives through to the planning of classes.

The cases are presented in great detail because it is in the minutae of course planning that many of the real difficulties lie. Some of these difficulties have been highlighted by including mistakes or attempts which were later abandoned. That means there is a lot to read, but most publications on course design present only the finished design; these studies are to help the reader explore the process, accordingly they are presented warts and all.

Only the minimum of commentary has been added to original working papers: these two volumes are *not* text books - they are collections of working papers in which the reader may find suggestions, discover unsuspected problems, and get an overview of the work involved in the systematic design of courses. All these case studies have been successfully used on UTMU courses.

The *processes* of course design illustrated are to a degree independent of the subject matter of the course; so these studies will be of interest to all academic staff engaged in developing courses. However, each of the courses chosen broke new ground in their field in terms of the content or form of the course. They have, therefore, an additional interest to people concerned with postgraduate teacher training, general medical practice, and the design subjects such as architecture and industrial design.

To help the reader distinguish commentary from original course working documents in the first case study, two colours of paper have been used: yellow for the commentary written for the volumes, and white for original course documents. For the second study, white paper has been used throughout.

The second volume in this series is in the process of being produced and should be available by November 1976.

General Introduction

There are many publications on the theory of writing educational objectives and of designing courses, but there are very few freely available examples of complete courses illustrating the theory being applied. No detailed accounts of *how* a particular course was designed from start to finish seem to have been published. The purpose of these two volumes is to present three worked examples to *illustrate the process* of designing a course.

Each of the cases included in this series involves a detailed statement of educational objectives. Despite the vogue for using the term 'educational objectives' in educational literature for almost twenty years, now only a tiny minority of courses in higher education are actually based upon a detailed statement of objectives. In a few cases it may be argued (not unreasonably) that the benefits to be derived from such a statement do not justify the considerable effort involved in producing it. Less convincing is the argument that a course is so 'open ended', that it has no objectives common to its students. For a course to be arranged at all implies that the organisers are unwilling to leave learning to chance; it follows that at the very least some outcomes are more desirable than others. There are other good reasons why so few courses have carefully written objectives; staff may find the task too time consuming or too difficult; they may feel that the objectives they have seen (or can think of) do not adequately describe all that they would like their course to allow students to learn. Perhaps having made a start in identifying objectives, a group of staff find some differences of opinion between them which are too far-reaching to solve quickly so the idea gets dropped. Whatever the reason, it seems that the theory provided by the text books, excellent thought it may be, and the few examples provided for emulation, are not enough to help practising teachers grasp the realities and identify the problems of designing courses systematically. We might pause to consider why.

Benjamin Bloom and his associates produced the first volume of their (uncompleted) *Taxonomy of Educational Objectives* in 1956, giving impetus to an interest in detailed educational planning which had been growing during the preceding few years. Since then Mager (1962), Gagné (1965), Scriven (1967), Sullivan (1969), Stones (1972) and others have each offered a theoretical structure for differentiating and relating educational objectives. Warren Piper (1967), McKenzie *et al* (1970), and Lewis (1971) have been among those who have described procedures for designing courses. Some books have provided a selection of objectives drawn from a variety of courses; e.g. in this country the UTMU Conference report on Objectives in Higher Education, and in the United States Bloom and associates (1971) have produced handbooks of objectives. Beard (1972) has discussed the writing of objectives in higher education.

More recently two English books, Rowntree (1974) and Stenhouse (1975) have reviewed systematic course design at length and a UTMU publication (1976) has provided an introductory guide for lecturers. All these books

present carefully selected examples of objectives being used in designing courses. However, the examples presented in all these texts are of limited use to a lecturer trying to design a course of his own *precisely because they are carefully selected.* The objectives are in polished prose which hides perhaps a dozen less satisfactory earlier workings and maybe years of practice. The reader is given no opportunity to learn from those earlier attempts at overcoming shortcomings. The final versions may show the learner what was done but give few clues as to *how* it was done. Likewise these examples of course planning where objectives are related to teaching plans are almost always portions of a course selected to illustrate a particular point. Faced with the task of designing a whole course which keeps its various parts in balance, the novice planner comes upon problems which go unremarked in the texts. The published examples have two major shortcomings as aids to course design: first they illustrate the end product of designing rather than the *process*; second they show only parts of a course.

None of those generalised models can be applied like a recipe. One reason is that taxonomies of course objectives are attempts to make categories which emphasise a few chosen relationships out of the thousands that are possible in an exceedingly complex area. Other categories and relationships which are ignored or masked by one particular taxonomy may be the very ones which are important to a particular teacher concerned with a particular course. Each course has to be approached anew; every thinking teacher will analyse her or his objectives in a unique way and will find strategies for developing a course which her or his own conceptions and personality as well as the circumstances under which the course is being prepared.

Experience in the University Teaching Methods Unit suggests that there is a need for some very detailed accounts of courses being designed. The accounts should illustrate how various people have tackled the task and should show the choices they faced, their misjudgments as well as their intellectual coups, the drafts they rejected as well as the final well turned prose, their unsupported guesses and prejudices as well as their well substantiated arguments. The inexperienced course planner needs some suggestions of what to try next when her or his first attempts fall short of her or his purpose, and needs perhaps some reassurance that these first attempts are, as likely as not, much the same as the first attempts of the specialist.

This collection of case studies is an attempt to meet these needs. The three chosen studies emphasise different aspects of the processes involved in arriving at a final design. The case studies in this first volume illustrate the process and problems of categorising educational objectives. The second volume illustrates in detail the writing of objectives and the steps which lead on from that stage to the organisation of classroom activities.

It is not the purpose of this series to consider the evaluation of the courses themselves, rather it is to illustrate and comment on procedures for handling the complex material involved in the planning process. (The important matter of evaluation will be taken up again a little later.)

The cases illustrate different attempts to put theory into practice. The

subjects of the courses differ widely; as do the personalities, interests and competences of the teachers involved. These teachers, however, do share two things: first, they believe in trying to make explicit the rationale behind what they do as teachers, and that a systematic approach to designing a course helps them to release themselves from conventions and attain a more creative result; secondly, they all elected to work with members of the University Teaching Methods Unit of London University.

The Way The Cases Have Been Presented

When preparing these case studies it was a difficult decision to decide what kind of commentary to write around the documents. The purpose for choosing each of the three cases was rather different and accordingly the commentaries are written in a different way and had better be described separately.

The first case by Dallas and Piper is used mainly to illustrate two things: first, the working relationship between the subject specialist and the education consultant, second, the way in which the course objectives were chosen and set out on a chart. The commentary concentrates on these issues. Consequently it describes how documents passed between the two authors, describes the drawing up of the chart, and comments on why particular objectives were chosen and in some cases how they were received by students.

The second case study serves to illustrate a variation on the objectives chart which is accompanied by very little commentary. It also provides another example of the same basic chart being used to reveal the complex relationship between various objectives on a completed course.

Neither of these cases contain any detailed discussion about why the way in which an objective was described changed from one draft of the course plan to the next. That issue is considered in detail in the third case study which appears in another volume. However, some general guidelines are given in the next chapter.

A careful reading of the documents will undoubtedly raise in the reader's mind many issues or specific questions on specific points which are not discussed in the text. Such gaps in exposition would be a weakness in a text book, but are a virtue of case study material, the purpose of which is to raise issues in the reader's mind and allow for an exploration in depth of various problems. The text books might suggest some of the answers.

Selected passages of these can provide the basis of exercises or discussions for staff and may be freely used provided their course is acknowledged.

Some characteristics of the case studies

These case studies are working documents. They are presented with no attempt to hide defects or omissions and they illustrate the shortcomings as well as the strengths of the people involved and the concepts and strategies they adopted. They also reflect the vicissitudes of the real world where time, money, politics and the vagaries of human judgment conspire to confound the neatness of a theoretical model.

The peculiar purpose of these studies has resulted in their format

differing in a number of significant ways from the usual text. In consequence rather more is demanded of the reader than would be by a straightforward explanatory book. The format is somewhere between a continuous text and an unordered collection of course material such as one finds in the "Jackdaw" files designed to capture the interest of children in historical events.

The basis of the first and third case is a sequence of documents, which sometimes supplanted each other. They are presented as they were produced by the course designers. Thus from the start a certain untidiness in the text is inevitable. It is important that the reader accepts various parts of the text for what they are, regarding early drafts as historical documents containing material which would normally be omitted from a published text perhaps because it is repetitive, poorly expressed, ill considered, or because the author subsequently found himself to be mistaken. Of course, that exemption does not apply to those parts of the text which are the authors' and editors' comments written for this book.

Some Discussion Points

This volume is a collection of working papers, not a text book. It is not part of the purpose of the volume to present a detailed explanation and critique of the texts. The detailed examination of texts from the first draft through to the final version is a major concern of the third case study which appears in Volume II. Attention in this case is concentrated on the category systems employed to set out objectives and methods. Nonetheless, some people might like to take parts of the text, in particular aspects of these first two cases, as the basis of group exercises or discussions. The following few paragraphs contain some notes which may be of help to discussion leaders or tutors composing some exercises. The notes draw attention to a number of key questions and comment on some of them.

1 The *content* of the courses

It is important to keep discussion of the content of the three courses separate from the discussion of the way in which a lecturer might go about the business of planning out a course. The three courses chosen each, in their time, broke with tradition in the subject matter that is included and the way in which it was taught. Hopefully teaching staff in disciplines related to the course subjects presented here will find items which suggest to them ways of improving their own courses. Perhaps more important though is that they should find topics which they believe would be best omitted, teaching methods which they believe inappropriate and assessment methods they believe invalid; provided only that they go on to discuss the issues with colleagues and where appropriate initiate investigations.

When new courses are launched, somebody is bound to ask if it has been evaluated. Although the idea behind evaluating whether one course is better than another at helping students learn a particular skill is comparatively simple, the practice can sometimes be exceedingly complex. When one talks of evaluating a whole University course the *idea* becomes exceedingly complex and the practice often impossible. None of the three courses described in these volumes has been 'evaluated' in a formal scientific sense. To have waited until they (or any other course) were before including them as case studies would have delayed publication, probably indefinitely. In any case, that kind of evaluation is strictly irrelevant to the main point of these case studies - that is, the method of planning.

Only parts of the Dallas-Piper course have been put into practice and the text reports on their success. The Cox-Kontiainen course is a proposed rather than an accomplished fact. The course described in the third case (presented in a separate volume) was run for two years and the study contains comments on how it went in practice.

2 Evaluation of design method

If the evaluation of course content is strictly irrelevant to the main

purpose of these case studies, the evaluation of the methods of analysis and exposition of the course is of central concern. What would be an appropriate way of evaluating the method? Questions of reliability or validity do not apply any more than they do when judging, for instance, the felicity of a sentence. There are perhaps three pertinent questions which may be asked: *How useful* is the method? *How convenient* is the method? And *what effects* does the method have on the way the course was organised?

Having said that, however, we are precious little nearer *measuring* the ratio. Both the usefulness and the convenience are personal judgments of the staff member involved. There can be no direct measure and no universal answer. All that we can do here is to lay out a choice of procedures and allow each lecturer to select according to her or his purpose and predilections.

The third question is much more deserving of academic study. Obviously the way in which a course is described affects in some way its final composition; form predicates content. This idea has been explored in other publications (e.g. Gray, 1973). It is, however, a subtle topic as yet largely uninvestigated by systematic means, and certainly beyond the scope of this publication.

Although the charts upon which the two cases are presented are large, they are, in basic structure, simple. Indeed the fact that such a chart can be constructed at all requires that only two classificatory schemes are adopted to set against each other. The question is whether, despite their essential simplicity, they still manage to present an analysis adequate for the job. What are the key characteristics of an analysis of course objectives? For the purpose of considering the two cases in this book, we might posit eight requirements:

(i) a clear statement of objectives distinguished from teaching methods
(ii) a simple structure classifying course content
(iii) objectives written in terms which suggest appropriate teaching methods (a taxonomy)
(iv) objectives which indicate criteria of success
(v) combinations of objectives which may be pursued concurrently
(vi) a presentation in which the classification of course contents and the classification according to the taxonomy may be related
(vii) a note of possible sequences of objectives
(viii) a note of working assumptions made

It is left to the reader to consider in detail the documents here presented in the light of these (and other) criteria. However, some brief remarks may be made on each of the eight points by way of helping discussion along. (Tutors who are using the case study for a group exercise may wish to withhold the following comments until the group has come to some conclusion of its own.)

In both the cases in this volume, the objectives are descriptions of what is it hoped students will know, do or believe *as a result of* the course. In this way the objectives are distinguished from the course content (point (i)). Very few objectives in either case are written in very precise behavioural terms indicating exactly what the student should do

under what conditions and with what degree of success. However, enough is said in most instances for such a precise statement to be written for any particular class (or series of classes). For example, objective 44.1 in the first case study reads "the student should become skilled in matching selected objectives with appropriate methods"; as it stands this statement begs two questions:

What *degree* of skill is required?

What will constitute *appropriateness*?

The important question is how clearly the writing of the objective indicates the need for the teacher to decide these two matters. A close reading of sections 45, 46 and 47 will reveal a number of points pertinent to resolving those two issues.

In section 44, the objective quoted above is grouped with a number of others which may be pursued concurrently as they all relate to the same kind of classroom activity. This grouping meets (the reader may judge how completely) requirement (v). Those items grouped under section 45 suggest a basis for evolving criteria of successful student performance. Thus, although a detailed description of a teaching session or an 'examination' is not given, *what is required of* that teaching session is specified in some detail. In this way an attempt has been made to meet requirements (iii) and (iv).

In each case study the course is analysed in two discrete ways. First, the course content is classified under a small number of general headings termed 'aspects'. Are the headings in each of the cases comprehensive yet simple enough to help the staff strike the right balance of emphasis on the various topics? At the same time, do they give students an overview of the course (thus meeting the second requirement above)? Ultimately the answers can be provided only by putting the analysis to practical use. The second form of analysis is according to a simple taxonomy. In both studies a distinction is made between knowledge, skills and attitudes, it being argued that these three, at least, imply different teaching methods and different assessment criteria. In the medical case study, the three types of objective are listed beneath one another, each being related to a learning activity and a method of assessment. In the Biology case study, the three types of objectives are listed horizontally and related together. Both arrangements may lead the author unnecessarily to find two additional objectives to match every one originally noted so as to give the chart a look of completeness. It may be stimulating to consider whether or not each objective implies others in this way but it does not necessarily follow that they should be found. On the other hand, in practical courses such as the two described here one might take a second look at a 'knowledge' objective which related to no skill and thus appeared to have no application.

The device of writing attitudinal objectives in terms of polarities ("away from", "towards"), the inclusion of a list of premises or assumptions, and the listing of what was to be assessed separately from the method of assessment were three innovations introduced to meet the problems arising in the Biology teachers' course. All three have proved sufficiently durable to be incorporated in subsequent course designs including the Cox-Kontiainen course presented here. The reader will want to consider whether the extra work was worthwhile.

The sequencing of objectives was not a major concern at the stage of course design represented by either of these case studies. That particular issue is considered in detail in the second volume of this series.

Under the title of 'premises' or 'assumptions', a number of working assumptions are noted. Often they concern the abilities or attitudes of students or the effectiveness of some adopted procedure. Each could remain a matter of professional judgment on the part of the teacher or they could be scientifically checked. Which is appropriate in any particular case is a matter for discussion. Another good critical exercise is to discover assumptions which have remained implicit in the text and might with advantage be added to those noted.

3 Writing objectives

The second volume contains a detailed consideration of the art of writing educational objectives. However, as all three cases start from a statement of objectives, some general points should perhaps be made in this introduction. Roy Cox, joint author of the second case study in this first volume, wrote an introduction to that case when it was first produced in the Unit. The paragraphs which follow are drawn from that original introduction. In them, Cox comments on the use of objectives:

> "Niblett and Pole (1972) distinguished different areas in which objectives have been studied such as curricula, methods of teaching and learning in particular subjects, the history of changing objectives, institutional organisation and subjects and institutional comparisons; and they discuss the general background and thinking about objectives in Britain.
>
> "It is not yet very clear which are the most appropriate ways of using specifications of objectives. They have in fact been criticised for encouraging an atomistic compartmentalisation and it is certainly easy to see many as merely a list which appears to bear little relationship to the 'logic of the subject' and gives very little guidance as to logical sequencing and structuring of the course. Although it is worth remembering that it is not always best, from the point of view of learning motivation, to concentrate exclusively on logically prior groundwork in introducing courses, nevertheless the logical structure is an important aspect of course design which is not generally a feature of statements of objectives. On the other hand it may be that the objectives clearly and fully set out would be a very useful basis from which to begin this different type of task.
>
> "Behavioural objectives have been criticised too for introducing a rigid mechanistic approach to education. If we value education in terms of 'the quality of life that it fosters, the opportunities for experience and exploration it provides, the concern for growth, for enrichment and for culture that it exemplifies' (Pace 1972), the behavioural language of some objectives writers can appear to be working with the wrong sort of analogies - concerned more with the question 'what does your machine produce?' than with 'how does your garden grow?'. This

has led one writer on the Arts side to make the distinction between 'instructional objectives' and 'expressive objectives' (Eisner 1969). The former fit a 'behavioural engineering' view of education as acquiring established knowledge and skills, the latter is concerned with modifying and expanding the cultural tools that are at present available. An expressive objective does not specify the behaviour to be learned, it identifies situations and problems for exploration, expecting a diversity of responses. These might be criticised as being learning activities rather than objectives but they do at least encourage an openness to diversity without a total rejection of the objectives approach and might lead to deeper consideration of the values of different degrees of prescription of criteria.

"Using objectives depends too on the level of generality at which they are written. If we try to express objectives in terms of what students should be able to *do* at the end of the course which they could not do at the beginning, and in a way which will enable a precise measurement to be made, it will involve complex specifications of the type of student response, the level of accuracy or detail and the conditions under which it should be done. In many situations it is important to do this, especially where a formal assessment is necessary, but where general guidelines for a course are wanted the detail can be confusing. Distinctions have been made between an 'aim', a 'remote end for the guidance of educational activity' and 'objectives' which describe what they should 'know, be able to do, prefer or believe'. But there is no reason why many levels of decision making should not be associated with different levels of objectives; Goodlad (1966) gives three, 'instructional', 'institutional', and 'societal'."

Peters (1959) has suggested that the term 'aim'* implies that a method of learning is implicit in a statement; an objective then would be a statement of the desired end result with no hint of how it is to be achieved. The two terms are used in this way in the main case presented in volume II.

4 Whose style - the teacher's or the consultant's?

Collaboration with a teacher producing her or his own course on a specialist subject presents certain challenges to a course design consultant. One of these is the matter of writing style. The point is very well illustrated by the first case. Mrs Dallas' course is very complex. The consultant's job in helping Mrs Dallas to move from her first course description to the second involved suggesting some analytical structure, and asking for precision on the description of objectives and methods. Yet Mrs Dallas' 'style' was a very noticeable and probably potent component of the course. Her writing is lively, challenging and, at times, polemical. Some of her criticism has an air of recklessness which can

* cf. Open University, Herritt's definition of 'aim' as 'value judgment' and 'objective' as 'prescriptions to fulfil value judgments', i.e. value judgment - "It is a good thing that ..... "; objective - "So we will teach the required knowledge and skills".

be engaging or exasperating depending on where you stand in relation to her target. It seemed essential that the distinctiveness and vitality of her prose be preserved even though the analysis entailed a systematic and critical reappraisal of her text. The aim was to be meticulous over matters of substance without being pedantic over matters of style; to be rigorous *enough* to complete an analysis upon which a course could be based, yet retain the language which revealed the author's commitment and attitudes. Each must judge for herself or himself the desirable point between punctilious detachment and enthusiastic commitment which best lends itself to a description of a course written for those who may become involved in it. The reader may also judge the degree to which the final text maintains the balance the authors sought, and whether they have sufficiently discriminated between those parts which require rigorous analysis and those parts in which a freer style serves a purpose.

In addition to differences of individual style, it seems probable there are differences in the language of people working in different subject areas. It will be noted that the same tension between styles of writing is not evident in the second case study. In that instance the two authors were both educational investigators writing an analysis from outside the medical profession: tension between consultant and subject specialist did not arise.

The severity of language difficulty for the educational consultant differs according to the subject of a course under analysis. The language of the sciences, especially the applied sciences, seems to translate easily into the language of the writer of educational objectives. Medicine and design seem well suited by this peculiar brand of educationalists' language. Arts subjects, particularly literature, seem ill served by the atomism and behaviourism which the writing of objectives may all too easily smuggle into the analysis of a course.

David Warren Piper

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Case Study 1

One Year Postgraduate Course in Teaching
for Biology Graduates

1: Preface

An apology is needed for asking overworked lecturers concerned with teacher training to make the effort needed to comprehend this collection of working papers. In mitigation it must be declared that teacher education is a very complex process; to try to categorise it is almost impossible, but it is hoped that this effort, an attempt by four tutors to state what they think they are doing, how they are attempting to assess its results, and to discover by analysis what gaps exist in their present teaching strategies, will help those determined enough to read it.

This collection of papers is based on a one-year postgraduate course run at King's College London from 1970 for Biologists intending to take up secondary school teaching. An introduction gives a guide to the papers included and describes the categories used in the analysis presented.

As these case studies are intended to illustrate the practical aspects of designing courses it is worth noting briefly the logistics involved in the production of these documents.

In the first instance Dorothy Dallas approached the University Teaching Methods Unit with a document in which she described the teaching objectives of a proposed postgraduate course for Biology teachers. She wished to develop the ideas contained therein. In accordance with the normal practice of the Unit, one of its members, in this instance David Warren Piper, was assigned to the project. Other members of the Unit could be (and were) asked to contribute and criticise as the project progressed.

The first task for the authors was to agree the categories they would employ in their analysis - the result was an outline of the chart facing p 23 (some comment on those categories accompanies the chart). They then worked together on analysing each 'cell'. To begin with Dallas, as the subject specialist, took the lead on the analysis of the course content (making distinctions between the rows of the chart) and Warren Piper, as the methodologist, was principally concerned to make distinctions in objectives which implied variation in teaching and assessment methods. The roles did not remain discrete and much of the analysis resulted from an interplay of ideas from the two authors. Thereafter successive drafts of the text were shuttled back and forth between them and on two occasions submitted to a group of colleagues who first wrote comments on the script and then met together with the authors to run through their criticisms. The four colleagues were John Barker of the Centre for Science Education, Chelsea College, and Bob Lister of the Institute of Education, (who, like Dorothy Dallas, are concerned with training Biology graduates), Julia Clark of the Institute of Education whose students study the teaching of integrated science and Kay Pole then of UTMU who also offered comment on the methodology.

The next stage was to submit the draft, much as it appears in this book, to tutors and workers in the field for comment. They were: Edwin Catherall, Lecturer, School of Education, University of Sussex; Brian

Dudley, Lecturer, School of Education, Keele; Dennis Fox, Senior Lecturer, Nottingham College of Education; John Merritt, Professor, Faculty of Education, Open University; and Christopher Trewhella, Head of Biology Department, Epsom College.

Perhaps the most interesting comments were from Professor John Merritt of the Open University who had quite independently evolved similar categories to those appearing in the vertical axis of our chart, and had modified the basic three categories of the horizontal axis of the chart (learning objectives, teaching method, means of student assessment) in much the same way as we had. This and other comments are appended to each section of the analysis.

It is worth noting that the drafting of this course analysis took twelve months. This is the kind of time scale which needs to be envisaged in the undertaking of such work when the authors are already fully committed to the demands of their employment. *It has been our experience that many people seriously underestimate the time such work almost invariably takes.* The authors collected together a number of course objectives for teacher training from a variety of sources. Most were confused - especially in mixing analyses of curriculum and analyses of objectives - and all were superficial, as though the task had been seen as amalgamating postcard-sized lists during a couple of afternoons.

Dorothy Dallas
David Warren Piper

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The Document with which Dorothy Dallas first approached the University Teaching Methods Unit

(1970)

A Proposed Overall Pattern of the Graduate Training Year

I take as a basic premise that a two-year training course is economically non-viable and would have an adverse effect on recruitment, also that a totally school-based course although worthy of experiment would result in a somewhat parochial approach, would deny the student transfer from unsuitable schools, and would deny the student the advantage of meeting regularly and informally with both his specialist group and a wide variety of student teachers in other disciplines. I also assume a more structured probationary year.

Objectives	Method and timing
September	
1 Changing mental gear from University to child 2 Gentle introduction to the less able child and those to whom education seems irrelevant 3 To meet children as individuals, begin motivation towards psychology of learning and also to more general aspects of the introductory course	Three weeks apprenticed to a master teacher of remedial (or just above) classes. Student's role as individual tutor, laboratory technician, duplicator etc. Never alone with class; may take over small parts of work
October first fortnight	
1 Basic frame of reference for the variety of skills involved in teaching 2 Groundwork on attitudes to self-confidence, self-discipline 3 Systems analysis approach begun with limited attention to detailed educational objectives	Introductory course. Short, so that apprehension does not increase See further expansion
October second fortnight	
1 To allow student to become familiar with the attitudes, organisation and methods of the school 2 NOT to be used to provide the student with one teacher's method of coming to terms with his class, which the student is then expected to imitate!	Initial week of observation in school See further expansion

November - December

1 Student begins to practise and co-ordinate skills

2 Student uses the first half of practice to deal with emotional difficulties experienced with staff, children and self

3 Student uses last half of term to try a variety of methods and begins to question why he is teaching what as well as how. Motivation for theoretical work

4 Student selects a problem arising out of this practice as a basis for future project work

Student teaches half timetable with rest of school time used for lab rehearsal, lesson preparation and organisation, marking

One day in college used for lesson preparation, data retrieval, group catharsis

See further expansion

Students should now be sufficiently motivated to need some solid educational theory, backed with a modicum of experience, as a basis on which to make some personal value judgments.

Objectives	Method and timing
January/ February/March	
1 Objectives and assessment	In all of these the methods tutor should be able to rely for basic principle on the general theory course; it is the tutor's job to demonstrate their relevance to the student in his own particular field
2 Hierarchy of concepts and complexity - all topics taken at three ability levels	By as much student involvement as possible and as little lecturing
3 Organisation and administration	By seeing first class teachers at all levels, both in the flesh and on video tape
4 Integration of the first three into curriculum planning	
5 To make secure the student's own personal style of teaching, rather than imitate any other teacher	

6 To introduce the student to the wide range of curriculum projects both in Biology, integrated science and inter-disciplinary work, e.g. the Humanities project. (This can only be an introduction and here is an area for follow-up in the pro-bationary year.)	By solving practical problems (a) set by teachers in schools (b) set by his own project work See further expansion
April	
Maturation period	Two long essays
May/June	
1 First three weeks for co-ordination of new ideas	
2 By this time most are teaching like pro-fessionals, unless they have had to change schools etc. They are ready for their own class-room and responsibility - luckily the threatened explosion is usually averted with the onset of exams	Final practice Should be entirely student criticised, although perhaps this an objective rather than a method!
3 Techniques of revision lessons practised, i.e. active not passive!	
4 Students allowed to assist in the high mysteries of public examinations, particularly practicals which, alas, still take place or, with luck, CSE assessment of course work	

Students who consider their course work assessment unsatisfactory should have the option of a full, old fashioned examination.

Objectives of an Introductory Course in the Training of Biology Teachers

1 Recognition of certain attitudes which students possess on entry

(a) Of a variety of attitudes towards teaching

Possibly:
10% totally committed, refused research jobs, etc.
80% exploratory, wishing to try in a sheltered situation while being uncommitted. (This makes nonsense of ideas of teacher training in the same school for two years.)
10% totally uncommitted, wanting a further year in university, time to make up their minds - often convinced that GCE is in fact a year off.

(b) Of a wish to explore disciplines other than Biology

Early specialisation in schools and lack of choice in university may bring a late swing from science (which is not surprising!). Some tutors have expressed amazement at the lack of commitment to Biology and a lack of interest in lab work. It has been authoritatively stated that students have had enough lab work during their three postgraduate years and what most want is a complete change. This attitude militates against setting up science ghettos for teacher training.

(c) Of a lack of self-responsibility if not self-discipline

University lab technicians are notorious nannies, with the best of intentions, and many students expect the overworked teachers in schools to carry on this tradition.

There is also a low standard of giving in essays on time without nagging; students seem to be conditioned to require some extra external pressure to fulfil course work requirements and lesson preparation.

Adjustments required because of these attitudes

(a) Towards teaching. Making it quite plain to the 10% uncommitted that this is a year of *hard work*. They are receiving a grant to train to teach and this is exactly what they are going to do - after all, it is MY income tax they are wasting!

Giving *confidence* to those unsure of their ability to teach, often women who have a long tradition of their best not being good enough behind them (this seems peculiar to girls' schools). They need to appreciate that no lesson is ever perfect for every member of the class.

Allowing flexibility in the course so that *different career prospects* can be offered and that advice on careers and careful placing of students in first posts ensures compatibility. Teaching is tough enough even if you are totally committed.

(b) Swing from, e.g., lab work. *Flexibility in course work* so that those who do not wish to do laboratory work may, e.g., spend all their time on sociology if they wish, as long as their school work is competent.

More emphasis on the ways in which Biology can be taught apart from

lab techniques, of which, unfortunately, the Nuffield Projects have made too much of a god, assuming that as long as school children are measuring and experimenting they are also learning rather than following recipes without comprehension. *Ethics and aesthetics, perception, symbolism and concept formation* need more attention at the expense of lab techniques.

(c) Responsibility. Instant involvement in the running of biological supply for the course, production of material and kits for the course; *responsibility for as much as possible as soon as possible.* Tutors too often see themselves not only as the fount of all knowledge but the source of all supply! Examples of activities - trips to Smithfield to stock up deep-freeze, keeping inventory up to date, exploration of other sources of supply, making models and kits, one student trained to use photocopier for overhead projector transparencies who teaches all the others and is responsible for maintenance and supply. Students prepare and present most of the lab work.

On the essay problem, students are nagged during the introductory course and then told that this will never happen again!

Assessment can obviously only be subjective, but in discussing course work assessment with students it is made obvious that the tutor's responsibility is to produce people who will do a responsible job in teaching without perpetual supervision. Not all students will reach this state of maturity before leaving and again it is made plain that in writing references the tutor will not lumber the unsuspecting school with people who need nannies!

Assessment will also occur during project work later on in the course, where the ability of the student to find sources not only of data but of useful people and facilities and to use them responsibly certainly makes part of our assessment; although obviously again this is going to be very subjective.

2 Provision of professional skills

It is difficult to know where to begin as all the variables involved in teaching are so intertwined that the introduction of one, e.g. motivation, brings in all kinds of disciplines as well as the factual and conceptual content. Approaches vary from loads of techniques on the one hand to a plethora of educational theory on the other and the middle way is hard to follow.

I am suggesting that what is needed is a *basic practical frame of reference* which can later be deepened in its several aspects as time allows. I shall work backwards to this from a consideration of the total theoretical aspects of the course in relation to teaching practice.

I also suggest that the two professional skills about which students are most worried in an introductory course are *facts and discipline,* and that it is essential to tackle these first and lead on to a treatment of objectives rather than the other way round. Any consideration of discipline and facts must lead to a consideration of the variables involved at some depth, and there may well not be time for this, leading

to a hints and tips approach rather than a well thought-out basic frame of reference. Nevertheless this kind of consideration can lead to work on behavioural objectives and is an excellent introduction to it.

On the question of facts, most biologists emerge from Universities very confused by the mass of evidence given (e.g. about photosynthesis) without any clear concept of our present state of knowledge about this process. *Conceptual consolidation* is therefore essential during the year and cannot begin too soon. The remedying of *factual gaps* and the fact that many graduates may know very little about some *simple facts* taught at school and hence merely repeat the versions, e.g. of vegetative reproduction, *given unchanged over the decades* by O level textbooks.

Without a conceptual basis, it is of little use to introduce some idea of *systems analysis* in Biology method work. It is essential that this be done from the beginning of the introductory course; otherwise one encourages the type of lesson planning where facts are all, and practical work and visual aids are dragged in for the benefit of the tutor rather than as part of a structured learning situation for a class.

That systems analysis be based on concepts rather than on objectives in an introductory course is a pragmatic rationalisation, as the *student's idea of the teacher's role* so often needs to be changed; and unless gradualism is the order of the day, emotional rejection produced by previous conditioning may result.

Hence it would seem logical to introduce only the objectives of the *'scientific method'* category at first, consolidating and extending these at a later date. This work requires a considerable amount of time and is best done when students are motivated to ask the relevant questions, rather than in one fell swoop at the very beginning before any teaching practice has been experienced.

Knowledge of children as individuals rather than as an anti-teacher group is essential in an introductory course and is often difficult to achieve from an organisational point of view.

Long-established systems of teaching practice and the somewhat petrified arrangements which go with them have small groups of students going into a class as supervisory helpers to the individual child rather than as individuals totally responsible for the class. I do not know of any part of England or Wales which has not, (e.g. under the pressures of Box and Cox in the colleges of education), had to give up this valuable practice whereby students get a deep *appreciation of a class as a variety of individuals.* Other objectives here are that the student has the opportunity of changing mental gear, from trying to keep up with University dons to trying to appreciate how he thought as a child, comprehended as a child and talked as a child.

Length of an introductory course should probably not be more than four weeks because:

(1) Much theoretical work may take place in an unmotivated vacuum

(2) Student apprehension of the terrors of practice in a one-year

course increases as more and more dire warnings are given and more and more theory reveals to them the complexity of the nature of the work

(3) The niche for laboratory work is in the school, during practice, where the student can rehearse and experiment one week and teach it the next, with a critical follow-up as to its efficiency

III

The Document
Produced by
Dorothy Dallas
and David Warren
Piper
(1971)

ASPECTS	PREMISES	LEARNING OBJECTIVES			METHODS OF TEACHING AND LEARNING SITUATIONS	WHAT IS TO BE ASSESSED	METHODS OF ASSESSMENT
	01	Each End of a Continuum of ATTITUDES AND VALUES 02	KNOWLEDGE 03	SKILLS 04	05	06	07
10 **PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER**	11 a) Many are not irravocably committed to teaching b) Many are not committed to science alone c) Some theoretical work essential but must be made relevant d) Didactic methods inefficient e) Concern with moral issues and social responsibility of the scientists essential	12 Away from: – stereotyped image of teaching as dull, uncreative Towards: .1 Variety of philosophies and teachers' roles .2 Knowledge a vehicle .3 Variety of educational objectives .4 Unique nature of science .5 Morally educated teachers and pupils .6 Concern with ethics and aesthetics of Biology	13 .1 Basis of philosophy, psychology and sociology .2 Of different forms of knowledge .3 Of objectives in education .4 Of determinants of uniqueness of science .5 Of criteria for moral education .61 Of ethical principles .62 Of aesthetic approaches	14 .1 } Ability to perceive philosophical .5 } significance of variety of schools. Ability to reach a defensible compromise with own ideals and those of school .2 } Ability to make critical .3 } evaluation of place of Biology .4 } Ability to relate practical work .61 } in Biology to ethical standards .62 Ability to draw out aesthetic implications	15 All categories: Work made relevant to classroom using videotapes. Time spent in variety of schools. Group discussion, written work. Teach teaching by theoreticians and practitioners Concise background information made available. Written work can be valuable when linked with practical experience In addition: .3 A synthesis of necessary objectives .3 Practical applications of a variety of objectives by tutors themselves .3 Students attempt to construct work with specific objectives in mind .6 Construct learning situations with ethics and aesthetics in mind	16 .1 Selecting a suitable post .2 Constructing own curriculum and lessons .3 } Awareness of a variety of .4 } objectives. .5 } Awareness of need for ethics and .6 } aesthetics	17 Practical work: Plan and execute a series of lessons modifying theory with respect to constraints. Helped to evaluate success; suggest framework for doing so Theoretical work: – four short written pieces, one extended – two long essays. Assessment primarily for student to recognise own skills and abilities in producing soundly based value judgments: secondarily as a means of effectiveness
20 **CONTENT OF COURSES TAUGHT**	21 a) Knowledge of primary education b) Need to accommodate a wide variety of degrees c) Students feel insecure outside their main subject area d) Students often unable to sort out basic concepts of science e) Students need to be willing to tackle all ability ranges, 11-18 f) Students often have stereotyped ideas of what constitutes good teaching method	22 Away from: – uncritical use of texts – inability to cover whole field of Biology, or to integrate it with other sciences – inability to teach anything but Biology, or to relate it to interdisciplinary work outside science – uncritical acceptance of courses Towards: .1 Defining concepts and hierarchies .21 Confidently covering all aspects of Biology; confidently covering lower school science curricula .22 Integrating biology into a general framework of knowledge .3 Critical appreciation of range of curriculum reform	23 .11 Of conceptual hierarchies .12 Of normal range of mental and social skills .21 Of as much of the full range of factual biological knowledge as possible and of lower school science .22 Of the case for Biology as in integrated science .3 Of the methodological and conceptual basis of curriculum reform projects (also 16)	24 .1 Construction of hierarchies of different ages and abilities .2 Critical and relevant selection of facts .3 Some skill in criticism of curriculum reform	25 .11 Discussions to produce schemes of basic concepts .12 Programme hierarchies; use in schools .13 Variety of methods for gaining background knowledge on development of learning .14 Practical application of this by primary school and remedial class work .21 Subsidiary course in physical sciences. PRY .22 Resources and tutorials for gap filling .23 Construct and use examples of integration .24 Curricula are examined .31 Variety of methods for acquainting students with philosophy of curriculum reform projects .32 Conceptual and methodological analyses of reform projects .33 Rehearsal and criticism of new techniques in school and college. PRY	26 .1 Selection of clear frame of reference in Biology .12 Selection of hierarchies suitable to age and ability .21 Extent of security of biological knowledge .22 Extent of interdisciplinary approach .3 Critical use of curriculum reform and ability to select relevant course for PRY	27 All categories: .1 Project .2 Performance in school – checklist .3 Long term assessment
30 **CLASSROOM TECHNIQUES**	31 a) Appropriate techniques involve many variables. Some dealt with in other categories b) Failure and success of a particular teaching approach are relative to the age, aptitudes and abilities of the pupil c) Attention must be paid to obtaining intelligible feedback	32 Away from: – small range of techniques from own experience – thinking of class as homogeneous entity – assuming pupils' motives similar to those of the teacher – passive pupils Towards: .1 Wide range of techniques .2 Perceiving class as individuals .3 Pupil motivation influenced .4 Active pupils .5 Pupils experiencing success .6 Immediate and valid feedback	33 .11 Of a variety of methods .12 Of a variety of hardware .21 Of the range of development .22 Of small group psychology .3 Of various ways of motivation .41 Why passive learning is inefficient .42 Methods of communication .5 Of ways of ensuring pupils experiencing success .6 Of ways of structuring immediate and valid feedback	34 .11 In as many different methods as possible .12 With machinery .21 In applying knowledge of development .22 In structuring groups .3 In effective use of motivation .4 In communication .5 In ensuring successful achievement while extending range in which this is possible .6 In modifying approach as a result of effective feedback	35 All categories – learning on teaching practice .11 Diagnosis of initial attitudes, critical essay .121 Observation and practice of methods .122 Formal training in use of hardware .123 Production and use of aids by student .2 Background knowledge and relevant use of work on development and small group dynamics .3 Motivation .4 Communications theory .5 Apprenticeship to master teacher of least able pupils .6 Examination and use of immediate feedback methods	36 All categories: – adoption of appropriate vocabulary – adoption of the appropriate teaching style. Checklist In addition: .12 Adequacy in use and rehearsal of techniques and aids .123 Possibly assessment of software production .3 Extent to which pupils are motivated towards and involved in active learning. Checklist .6 Ability to modify from feedback	37 All categories: – student centred assessment of abilities on teaching practice In addition: .12 ILEA Certificate .123 Software may be assessed in project .3 Discussion of checklist .3 Discussion with tutor .6 teachers and students (see also 67.1)
40 **INTEGRATION OF CONTENT AND TECHNIQUES**	41 a) Content and method must be synthesised b) Judgement by peers is an effective learning situation	42 Away from: – overemphasis on factual acquisition – assessing traditionally – regarding content as self-justifying – having no concept of cost/benefit Towards: .1 Adopting appropriate methods of achieving objectives .2 Continual evaluation of efficiency (a) of teacher (b) of pupils' achievement .3 Evaluating alternatives in terms of cost/benefit	43 .11 A conceptual model to assess priorities .12 Of lesson analysis, curriculum analysis .21 Of a variety of forms of assessment .22 Of a variety of procedures of formal assessment. PRY .3 Methods of application of time/money costs/benefit analysis	44 .1 In matching objectives with methods .21 In improving own performance .22 In determining achievements of pupils .3 Efficient coordination of all procedures	45 .1 Lesson analysis .21 Criticism by self and peers .221 Criticise, construct and use procedures for pupil assessment .222 Criticise standard scheme of assessment .223 Assist in school examinations .3 Criticise simulation schemes in cost/benefit terms	46 .1 Checking analysis sheets by student and tutor Checklist of special situations .2 Effectiveness of selection of assessment .3 Awareness of time/cost/benefit criteria	47 .1 By teachers, tutor, self and peers on teaching practice .21 By theoretical and/or practical assessment .22 Further work usually needed in PRY .3 Not assessed on course – long term objective
50 **ORGANISATION AND ADMINISTRATION**	51 a) Students not self reliant in laboratory organisation b) Students unlikely to question present systems c) Students unlikely to question national policy	52 Away from: – relying on technicians for organisation – ignorance of administration of education – limited concept of professional role – ignorance of interaction between parts of system Towards: .1 Efficiency in biological supply, and organisation .2 Understanding administration procedure and policy .3 Awareness of role of professional teacher .4 System seen in totality	53 .11 Of courses, management, preservation of supplies, and their attendant dangers .12 Of laboratory design and class organisation .13 Of financing laboratory and field work .14 Of estimates and petty cash .2 Of structure of the educational system and comparison with other countries .3 Of career structure, actual and possible .4 Of interaction between parts of system	54 .111 Ability to organise laboratory efficiently .112 Administrative, financial and communication skills .113 Human relation skills .13 Judgment on laboratory design .2 Of precising reports and writing succinctly .3 Of contributing to own and others career structure .4 Ability to assess ecological balance of system	55 .111 List of livestock supply .112 Order and obtain own supplies .113 Practice safety precautions .12 STEP exercise on ordering .131 Organise lab classes on teaching practice .132 Criticise video tapes of organisation .133 See films, plans, meet lab designers .21 Programmed course on educational system .22 Precis reports as group activity .3 Investigate variety of work in education, variety of unions .4 Information discussion of interactions within system	56 .11 Ability at organising supplies and .12 class work with safety, and efficiency .13 Efficiency at simple laboratory skills (self-assessed) .21 Knowledge of administration .22 Ability to produce concise reports and value judgments .3 Appreciation of full professional role – long term .4 Appreciation of interaction – long term	57 .1 Observation of practical work and from informed comment .2 Long essay or concise reports (see 17) .3 Long term and fall out rate in first two years .4 Long term, not assessed on course
60 **INSIGHT ON OWN PERFORMANCE**	61 a) Aware of extensible and non-extensible limits of personality and intellect "Preservation of the teacher" b) No such thing as the "ideal" teacher	62 Away from: – inert drifting into teaching – lack of insight into self Towards: .1 Realistically self-confident in own teaching style .2 Insight into self .3 Knowledge of care for and maintenance of own health, and that of others	63 .1 Of a variety of teaching roles .2 Of personality development .3 Of physical, social, psychological, pathological aspects of health, and of the irrational nature of many health choices	64 .1 Select own approach and use role playing .2 Apply insights learned with circumspection .3 Take action on health matters without hypochondria	65 1. Develop own style on teaching practice, and see acknowledged experts .2 Background knowledge of psychology and philosophy and applied when appropriate. .3 Programmed course in health. Checklist	66 .11 Ability to criticise own performance .12 } Performance depends on health .2 } as well as insight .31 } .32 } Implementation of health knowledge	67 .1 By discussion of four-point check- .2 list .3 Students assess own knowledge of health matters by pre-test questionnaire. Long-term assessment only of implementation

A SUGGESTED ANALYSIS SCHEME FOR THE WORK OF TRAINING AND EDUCATING GRADUATE BIOLOGISTS INTENDING TO ENTER THE TEACHING PROFESSION

UNIVERSITY TEACHING METHODS UNIT, DEPARTMENT OF HIGHER EDUCATION

UNIVERSITY OF LONDON INSTITUTE OF EDUCATION
55 Gordon Square, London WC1

A SUGGESTED ANALYSIS SCHEME FOR THE WORK OF TRAINING AND EDUCATING GRADUATE BIOLOGISTS INTENDING TO ENTER THE TEACHING PROFESSION

Dorothy M. Dallas, Lecturer, Faculty of Education, King's College, London.

David Warren Piper, Senior Lecturer, University Teaching Methods Unit.

With material and critical assistance from:

John Barker, Lecturer, Centre for Science Education, Chelsea College, University of London.

Julia Clarke, Senior Lecturer, Institute of Education, University of London.

Robert Lister, Senior Lecturer, Institute of Education, University of London.

Kay Pole, Research Office, University Teaching Methods Unit.

(This is the front cover of the original document, 1971)

Introduction

To try to disentangle the multifactorial situation of teacher education is an impossible task. We hope, therefore, that critics will bear with us with respect to the inevitable repetition in some sections of this analysis. We welcome all suggestions which could help to obviate such deficiencies while nevertheless considering that such an analysis is a worthwhile exercise to help in the clarification of objectives.

It is not intended that the analysis should serve to dictate structure and methods to departments - each will have its own specialist emphasis on some aspects of the work - but rather that it should aid the rigour with which objectives are compiled, achieved and evaluated. The graduate education year is already overloaded and discussion is taking place as to which are priorities and which best placed in a structured probationary year.

Similarly, the current debate on the role of the school in teacher training may benefit from the use of such an analysis; opinion is sharply polarised - from those who consider that an acquisition of teaching skills is the first essential to those who feel that theoretical considerations are of prime importance. Such polarity tends to be unproductive but a compromise solution needs aids to thought and it is hoped that the final edition of this analysis may prove useful.

Finally, in the training of Biology graduates we have perhaps the most varied group of entrants to provide for who will go to the most widely varying selection of teaching posts - flexibility without omitting essentials is difficult to achieve, and here again it is hoped that the analysis will provide some useful pointers for consideration.

Dorothy Dallas
David Warren Piper

Note on the concept of assessment used in this analysis

Too often in teacher education only one aspect of assessment has been used, namely that of the classification of the abilities of a student teacher for use by authorities in deciding whether or not he shall continue his course, change it, or whether he is a suitable candidate for a teaching post. The student has been largely unaware of the criteria used in making the assessment and wide variations in standard have been observed.

Two other aspects of assessment have often been omitted, or even regarded in some quarters as rank heresy, namely that:

(a) A student should be aware of his own areas of particular skill and excellence as well as of his deficiencies. When assessment ceases to be a one-sided process, the student is enabled to improve his performance by the insights so gained as well as being able to learn about assessment procedure in a highly motivated situation

(b) Tutors and teachers alike should have valid feedback as to the effectiveness of the education they are providing. They will need to devise their own methods to suit their particular situation, hence this aspect of assessment is not dealt with in this analysis.

When assessment is mentioned in this analysis, therefore, the underlying concept of co-operative assessment between student, teacher and tutors is envisaged as outlined in (a) above.

Implementation

To begin the process of obtaining feedback on the efficiency of learning situations provided for teachers in training, the assessment sections of the analysis were printed separately (see Appendix A1) and circulated to students and some teachers associated with the Biology Method and Integrated Science groups at the Institute of Education and King's College, and participants were asked to use them to assess two video-taped lessons. The discussion was lively! Increased awareness by students of the objectives which they might hope to achieve in teaching practice was produced and soon other student groups requested Appendix A1, both as an aid to a fuller use of teaching practice and as a paper for discussion. Students produced no suggestions for alteration, so Appendix A1 can be presumed satisfactory at least from the student point of view. This, in a condensed and still imperfect form, is now used by student Biology teachers at King's College as a basis for self-assessment (in the adoption of appropriate teaching style) at the end of the training year - appended as A2 and referred to in Sections 36 and 46.

The discussions prompted the question 'Why do so many teacher trainers refuse to expose their assessment systems to constructive critical feed-back?' It was felt by some that secretive assessment was:

(a) an ego-support mechanism for the assessor

(b) a refusal to do some hard thinking about assessment

Note: Although the section in italics was in the original document it is in nature of a comment and accordingly has been indicated by a different typeface.

(c) *an illogical feeling that only those objectives which were capable of objective assessment should be overtly discussed - those necessitating subjective value judgments were thereby relegated to even less accurate assessment in verbal and written references*

(d) *the means of producing students insecure in value judgments about their own performances, including those who do not realise how good they are as well as those who spend a great deal of time and words trying to convince themselves (as well as others) that they are much better than they are.*

A note on the division of labour between the graduate training year and the probationary year, and between the tutor in college and the teacher in school

In the present state of the debate on these two topics it is impossible to include in the analysis anything but the status quo, although the following implications emerge:

The Probationary Year

(1) The need for in-service training of science students in depth in a *curriculum reform project* of special use in their first post. There are so many curriculum reforms in science now that it is impossible to include a full training in all in the graduate year. (See Section 25)

(2) The need for in-service training in local examination board *practices in CSE* in particular and in other examinations. A theoretical basis can be given in the graduate year, but boards vary so widely that further work is essential in the student's first post. (See Section 43)

(3) There is at the moment considerable protest about the academic irrelevance of some of the *educational theory* work in the graduate year. It has been suggested that work on the English educational system, for example, might be more significant in the probationary year. There are others who feel that all theory should be relegated to a Master's degree after five years in teaching.

(4) Probationary teachers should have some means of discussing *day to day problems* with informed sources outside the school. Many students keep informal contact with their department for such a purpose, while others are recommended to the nearest University department available. Should formal arrangements be made on such lines?

(5) *Training in the use of visual aids.* This is often difficult to arrange in large University departments, and such training as is given is often not recognised by authorities as proof of proficiency. However, if the students do not have hardware training in the graduate year, they may not be allowed to use the school's machinery and obviously will suffer from this handicap during practice.

College Tutor and the Teacher in School

(1) Many feel that the present variation and flexibility in the inter-

relation between the two are undesirable. For example, in some schools students are treated as slave labour, while at the other end of the continuum a student may be allowed only 20 teaching periods in a six-week practice. In some schools the experienced teacher makes the University tutor practically redundant, whereas in others the tutor is the only agent in the learning process.

(2) Whereas independent schools have *time* to take a serious interest in teacher training and contribute to the college course, crushing pressures of timetable organisation prevent many valuable state school teachers from doing the same.

(3) Clarification of objectives and methods to the teachers concerned and delineation of roles is essential but is unlikely to be achieved without considerable *organisation*, education and possibly some form of assessment of the suitability of the teacher concerned. Typical remarks from teachers include "I've got a student next term - what am I supposed to DO with him?"; "Well, yes, there was a riot but I didn't know whether I was supposed to interfere or not"; and from friendly visiting inspectors "You realise that your student is seeing no good teaching nor getting any help at all from this school". Perhaps the worst example was when a visiting student had to calm down the class of the student on practice in a school where the teachers were paid to supervise students but were given neither time nor training to enable them to do this. Payment of teachers without ensuring that they are adequate for the work is irresponsible - but similar strictures can also be applied to the departmental tutor. There is no manual on teacher training, only the strictly heuristic method applied with variable results. Education authorities are unwilling for teachers to be paid pittances (after the tax man has been at them) for work which takes teachers away from what the education authority pays them to do, even though it could be argued that it improved the quality of the teaching. Teachers themselves have expressed resentment about doing work for which college tutors are paid at a much higher rate. The teacher tutor system needs a thorough spring-clean as do its objectives and the division of labour needed to achieve them. Solutions to this problem are criticised in the conclusions drawn from this analysis.

THE SUMMARY CHART

Although the chart summarises the course plan, it was also the first part of the new plan to be drawn up and it formed the foundation of the fuller analysis. The chart requires some explanation which was given verbally or in an accompanying letter when the document was originally circulated. The explanation also affords an opportunity for a critical review of the categories adopted from the analysis.

The columns (01 - 07)

The headings appearing across the top of the chart are the result of embellishments on a very simple scheme which consisted of just three columns: Learning Objectives; Learning/Teaching Strategy; Student Assessment. The aim was to list the objectives and relate each one to an appropriate method of teaching and assessment.

Objectives. The first embellishment was to draw some distinctions between different kinds of learning objectives. The simplest of distinctions was adopted: three categories, (1) attitudes and values, (2) knowledge, (3) skills. (These categories relate to the three domains of Bloom's taxonomy and have been adapted by Mager.) This scheme has the virtue of simplicity while being sufficient to require the analyst to look at the emotional, intellectual and practical aspects of the changes through which it is hoped the students will pass as a result of their course, and to suggest that a variety of learning and assessment strategies will be required to cover the whole gamut. Of course, there are many finer distinctions which need to be made: under 'knowledge', for instance, is a student required to recall certain information or simply recognise it when he comes across it; is he required to interpret it and integrate it with other information, or simply apply it in accordance with well-known formulae? Such distinctions as these, however, may be made in the formulation of the objectives themselves.

Premises. From the early discussions about objectives it emerged that a number of assumptions were being made. This must always be the case but it seemed helpful to write down some of these assumptions - particularly those which may not be shared by the reader, or which were peculiar to this particular course, or which warrant further investigation lest they prove unfounded. Some of these assumptions, upon which the objectives were premised, concerned the expected nature of the applicants (their previous experience, their prejudices); others reflected simple value judgments about what kind of course the organiser wanted to run; and others again were concerned with the supposed effectiveness of various teaching or evaluation methods. Thus, some of the items which appear in this column are questionable; indeed, they are noted there precisely because the authors recognised them as such. Every University course embodies some judgments, guesses, assumptions. Those that remain implicit are difficult to check. Therefore, there seems some virtue in trying to recognise and bring into the open those assumptions upon which some planning decisions are premised.

Assessment. The last embellishment arose in the assessment column. Even if the whole of the course had been student assessed, it would not have been possible to assess every aspect of every learning objective in all the students. Some had to be taken on trust, others would only be assessed

by long-term follow-up. A choice had to be made. Also, some of the objectives could manifest themselves in a multitude of ways giving the course organisers a choice of 'indicators of success'. A column was, therefore, introduced to identify just what was to be assessed, leaving the last column for an indication of how that assessment was to be made.

Relating items. All that remained was to adopt some means of relating items across the columns, so identifying the appropriate teaching and assessment strategies for a particular objective. This is not easy, as a particular teaching exercise can relate to a number of objectives which do not appear consecutively in the list; a thorough analysis would require a good deal of cross referencing. We experimented with a graphic solution but lines drawn from one entry to another simply confused the chart. We opted in the end for a simple numbering system, and left the subtler cross referencing to the insight of the reader. Even so the chart requires careful reading as related items are not horizontally aligned - it would be possible to do so but at the cost of doubling the depth of the chart. In the 'Premises' column (01), where there is not a direct point-by-point reference to cells in other columns, we have used letters instead of numbers. Letters have also been used in other columns on those occasions when a general, rather than a specific, relationship is intended.

The rows (10 - 60)

These six categories represent an analysis of the course content. One of the main aims of the course was to help students develop their view of teaching and of education. A good deal of that involves the student in exploring his own attitudes, beliefs and assumptions about education and broadening his knowledge of the theory of education. All those matters were included in row 10. Row 20 contains an exploration of the material which the students will themselves be teaching when they enter the profession. This included making good any gaps in the subject knowledge of, say, a Botany graduate who would need to include some Zoology in a school Biology course. Row 30 is devoted to techniques of teaching: these need to be related to course content. This integration of techniques and content seemed to warrant a row of its own (shown here as row 40) although the distinction of this category is perhaps the weakest in the analysis. One important aspect of a teacher's job is often overlooked in training: that is the organisational and administrative work involved in being a member of a school staff. That constitutes row 50. The last category is again one which is often overlooked and is much more difficult than the last to analyse and articulate. It is to do with the self-sufficiency of the teacher and his need to protect himself from the physical and mental ill effects of overwork and emotional involvement with children and the organisation.

10

Philosophy of the Curriculum and role of the Teacher

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

11 Premises

(a) A fair proportion of the *students are not irrevocably committed to teaching* and need help to make up their minds, firstly as to whether they teach or not and secondly in which kind of school they could find satisfaction in teaching. Those who arrive totally convinced that they want to teach are not necessarily those who finally become the most successful teachers. Conversely, many are unsure about teaching as their own experience had been unsatisfactory as pupils; some of these come convinced that there must be something better than that which they had to undergo.

Appendix B gives a typical student's attitude.

(b) *Many are not committed to science alone:* often they had their minds made up for them early in their school career and at this stage may actually be seeking a change of discipline. The majority express their attitude as wishing to deal with people and things allied to human behaviour rather than the more non-human aspects of academic science. Some never wish to see a lab or a field course again. Others hope that school will give them the chance to continue with academic science which their lack of a postgraduate science course has failed to do; in this category they often attempt MSc pure science courses in their first teaching post. Finally, there are those for whom PhD and MSc courses have not proved satisfying and those from industry who seek job satisfaction in teaching rather than money; and, of course, there are all shades of attitudes between these crudely sketched categories.

(c) Some *theoretical work* in education is essential but it must be *made significant and relevant to the actual situation* in the classroom and not left in an academic vacuum.

(d) *Students learn poorly when didactic authoritarian methods are used to excess.*

(e) Those involved in the education of science teachers need to *concern* themselves *with moral issues relevant* to the teacher's role, the organisation of the school, the use of animals in school and the *social responsibility of the scientist* and the technologist.

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

12 Attitudes and values of students

Away from:

the view that *teaching is dull and uncreative,* teachers are authoritarian, didactic handers-on of knowledge. This conforms with a *stereotyped* image which does not present teachers as real people but as indoctrinators of the compliant.

Towards:

.1 An awareness of the *variety* of working *philosophies* to be found in schools and other educational establishments and of a variety of *valid teaching* roles.

.2 Different forms of *knowledge* seen as a *vehicle* rather than as ends in themselves.

.3 An attempt to define a *variety of educational objectives.*

.4 An appreciation of the *unique nature of science* and scientific knowledge and methods of validation, e.g. the special place for experiment, replication and creativity in science.

.5 *Morally educated teachers* producing morally educated pupils.*

.6 *A concern with the special place of ethics and aesthetics in Biology.*

.61 A consideration of the justification, e.g. of the killing of animals for the purposes of learning.

.62 Appreciation of the aesthetic values of Biology from the elegance of an argument, the neatness of a solution to a problem, of a technique, to the awareness of natural phenomena of all kinds as excitingly complex systems to be respected and enjoyed. The days when Biology was identified with preserved specimens are, one hopes, irrevocably over.

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* Morally educated in the terms proposed by John Wilson (1969) in *Moral Thinking,* Heinemann, Concept Books.

.51 Attempting to take equal concern for others as for oneself.
.52 Being sensitive and perceptive of the needs of others.
.53 Having insight into human behaviour (see 63).
.54 Using skills of verbal and social communications (see 34).
.55 Being able to make judgments of right and wrong for himself, others and the community as a whole, and being able to act on these judgments.
.56 Being aware of the areas in which he lacks psychological freedom.

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

13 Knowledge

.1 The student should have knowledge of the educational *philosophy, psychology and sociology* upon which modern developments in educational practice are based.

He should also be aware of the philosophies behind practices which are now being replaced.

.2 .4 The student should be aware of the nature of different *forms of knowledge* and the nature of evidence and validation in science and other disciplines as a necessary prerequisite to *determining the unique nature of the contribution of science* to the curriculum (if indeed there is one) and of the scientist's social responsibilities.

.3 The student should have knowledge of various authors' work on *objectives in education* in the following fields:

cognitive - including "scientific method"
behavioural objectives - including habits of thought and moral aspects such as self-discipline*

.5 Knowledge and pragmatic application of Wilson's *criteria for moral education* to the teacher's role, the organisation of the school, the responsibility of scientists and technologists.

.61 Knowledge and pragmatic application of *ethical principles* to work with animals in school.

.62 Knowledge of *situations and material for use in aesthetic approaches* to Biology.

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* This involves the *consistent use of terms* employed in describing objectives; this is not found in the current literature and gives rise to considerable confusion.

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

14 Skills

.1 .5 The student should be able to perceive the *philosophical significance* of characteristics *of a variety of schools and their curricula* and should be able to make some evaluation of the education a school offers. With the freedom offered by the British educational system, the concomitant variety is enormous.

Having analysed a school in terms of the knowledge acquired in these categories, the student should be able to reach a *defensible compromise with his own educational ideals* in order to maximize his effectiveness within the school of his choice.

.2 .3 .4 The student should be able to make a critical *evaluation of the place of science* and particularly of Biology *in a school's curriculum.*

.61 Ability to *relate practical work* in Biology *to ethical standards.*

.62 Ability to *draw out aesthetic implications* where relevant and appropriate.

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

15 Methods of teaching and learning situations

All categories:

- the relevance of this work to classroom situations should, where possible, follow and consolidate the theoretical work by the use of video tapes showing different teachers' roles, different philosophies of schools, different objectives in science teaching etc
- students should spend time in a variety of schools as a practical exercise in this work
- group discussion and written work can be a useful consolidation
- team teaching between academic specialists, methods tutors and the teachers in school could be the basis of such work

Concise background information on:

- *theoretical basis* of educational practices
- *forms of knowledge*, place of science etc
- *moral education*

For the ability to produce soundly based value judgments, rather than undisciplined discussion in vacuo, such basic facts and principles are necessary; the formal lecture method is of doubtful value but other methods of communication are becoming more common and must necessarily vary with the tutor's personality and the organisation of the teaching situations.

.3 *Discussion*, after *previous preparation* of the work of a variety of authors and their terminology, *resulting in* some kind of *consensus and synthesis* of a variety of *objectives* and their relative importance for various age and ability groups.

.3 *Practical application by tutors of a variety of objectives* in their construction of learning situations for their students.

.3 Student's attempt both in theory and practice to *construct* and teach *work with specific objectives in mind* e.g. germination taken as an exercise in experimental design rather than merely factual transmission and demonstration.

.6 Methods with respect to ethics and aesthetics depend on the individual tutor. They may be appropriately treated together with the other categories for some, whereas others may wish to *construct special learning situations* with respect to ethics and aesthetics.

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

16 What is to be assessed

Since this section of the work can only open doors, or give an awareness of what is needed, *assessment* can hardly be anything but *informal* from the tutor's point of view. It is the *student* who needs to be able to *assess* his *own abilities* in this field - the tutor needs only feedback as to the effectiveness with which he has produced the awareness of the relation of theory to practice.

All categories are inter-related with respect to the following *needs of the young teacher:*

.1 *Selecting a suitable post.*

.11 The student's *ability to judge the educational objectives* of a variety of schools and to deduce the implied educational philosophy.

.12 The student's *ability to compromise his ideals constructively* to fit a school in which he is working rather than insensitively sticking to a preconceived idea of good teaching or unthinkingly conforming to the usual practice of the school.

.2 *Constructing his own curriculum and lessons.*

.21 The student's *awareness of the decisions which need to be made* to construct a practical curriculum which is philosophically sound, technically competent, adminstratively feasible and socially acceptable in line with general policy decisions within the school.

.22 The student's awareness of decisions to be made when selecting behavioural objectives from a list similar to (but not necessarily identical with) the one suggested in the Med. Thesis of Dennis Fox (Nottingham College of Education):

.221 Realistic, open-minded and accurate observation
.222 Experimental design - criticism only
- with help
- pupil's unaided effort
.223 Deducation and induction
.224 Hypothesis formation - little basis, only guessing
- with help
- pupil's unaided effort
.225 Technique, manual dexterity
.226 Improving verbal ability, literacy, numeracy
.227 Self-discipline and responsibility of pupils

.3 .4 .5 .6 The student's *awareness of objectives other than* those of techniques and facts when choosing curriculum reform projects.

The student's *awareness of the need for appropriate ethical and aesthetic* standards.

PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

17 Method of assessment

One of the more irritating results of analysis such as this is that one can become addicted to separation and omit synthesis.

Methods of assessment of .2, .3, .4, .5 and .6 in this category must essentially be synthesised under practical and theoretical aspects; it is unrealistic to assess theoretical work alone, without attempting to assess its application in the classroom situation. (See Premise 11c.)

A Practical application

Whatever the student's *theoretical ideas* may be, on teaching practice he is required to plan and execute a series of lessons within a school modifying his theory *with respect to constraints* effected by the school and by his own personality and skills.

He is *helped to evaluate his success* in choosing appropriate objectives and methods by his tutor and the teacher in the school, and the following list is a suggested framework of attitudes to the role of the teacher and the place of Biology within the curriculum:

(a) Teaching objectives conceived only in terms of *factual knowledge* which the pupils are to acquire. Methods didactic. *Passive learning* only required although demonstration and practical work may be used. Biology seen in terms of observed phenomena only, with no *integration of Biology with other* relevant *disciplines*, e.g. Physics, Chemistry and Mathematics.

(b) *Uncritical acceptance of curriculum reform* projects objectives with no sensitivity to local conditions or modification of the approach. Such projects used as a source of techniques without due attention being paid to their educational principles and objectives. (In most projects, integration of Biology with other disciplines is usual.)

(c) *Appropriate objectives* selected for the school and the class and attained using a *variety of active learning methods*. (NB: It is often difficult to make students aware that expert, active use of traditional methods is preferable to passive recipe-following situations which can result from inexpert use of curriculum reform projects.)

(d) Appropriate objectives and methods used in such a way that *pupils become self-disciplined*, i.e. able and willing to programme at least their own record and mode of working through required tasks, if not their own lines of investigation or the nature of the task itself.

While some progression is implied in this list, it is essential that students realise that there are situations where factors listed under (a) may be appropriate and those under (d) decidedly not! No teaching situation is ever perfect and to try to achieve or even to expect 100% success with every member of the class in every situation is a

sure way to madness. *Success* is a relative term and will be seen in quite different frames of reference by the student, the pupils, the tutor and the class teacher; one hopes, however, that the areas of agreement will overlap a great deal.

B Theoretical work.

In assessment of *theoretical* notions in this category, again differentiation must be made between the feedback necessary for the tutor to judge the efficiency of his course and the need for the student to recognise his *skills and abilities in producing soundly based value judgments*, and hence to be able to remedy his deficiencies and be secure in his knowledge and expertise.

The following scheme has proved useful, with cross-moderation between institutions, but is not regarded as perfection.

(a) Students select from a variety of topics which may have arisen from background information, discussions, school visits, video tapes or teaching practice and write a maximum of *four short pieces of original thought*, or synthesis or catharsis, (perhaps a polemic which could not be delivered in discussion due to the presence of too many louder voiced students) of a 500 word maximum.

Objectives - to help students sort out their own ideas and terms of expression in a concise form
- to help tutor's awareness of students' needs in factual areas, both their deficiencies and where personal interest can usefully be extended

(b) Any one of these may be extended into a *longer essay* requiring reading and integrating Biology method work with educational theory in some aspect, or the essay topic may arise from other sources, e.g. visits to schools. The minimum length is 3,000 words.

(c) Some of this work may be assessed in the project referred to in 27.

(d) An absolute standard for assessment in this category is impossible and judgments as to whether a student has worked to his full capacity are very subjective. It is, therefore, suggested that such *assessment* is primarily of value to the student in terms of self-awareness rather than grades, and *secondarily of value to the tutor as a measure of the effectiveness of the course of study*.

As team teaching by foundation subjects tutors and methods tutors is recommended, assessment should also be by both sections; certainly in the long essay if not in the short pieces.

The superficiality of essay questions in examinations is thus avoided, as is the woolly content of many long essays.

20

Content of Courses Taught

10 RÉSUMÉ OF CRITICS' COMMENTS ON THE PHILOSOPHY OF THE CURRICULUM AND ROLE OF THE TEACHER

The declared aim of modern philosophy is to clarify areas of confusion; confusion is worse confounded as the word 'Philosophy' is used in this section of the chart in two ways:

(a) as an indication of a particular method of thought, i.e. the 'philosophy of education' component of most graduate certificate courses
(b) as an indication of what particular schools consider to be their aims and objectives, whether these are explicit or implicit

Philosophy of education courses often invite the criticism that they rarely rise above the first of Bloom's* cognitive categories, the transmission of theories, generalisations and principles, and that rarely do they perform this function successfully for students with a minimal knowledge of the subject. In this area at least half of the student body experience feelings of failure, having some recognition, some recall, but little synthesis or field cognition, being inadequate in application, incapable of analysis and totally lacking in creativity. In the short time allowed in most courses, is competence in this field an unrealistic goal? While technical expertise in the field of electronics may be possible without a knowledge of the academic theory of semi-conductors, is a similar learning situation possible in the philosophy of education? Would concept teaching (i.e. learning through a number of experiences of a particular philosophy of education without attempting definition, where knowledge and skills are tested by application rather than be explanation) be a possible answer?

This is a vital area of the curriculum, and one in which least notice seems to be taken of feedback. "The philosophy of education leaves me cold. So much of it seems to be an attempt by the teaching trade to bolster its own inadequate ego", said one of the school master critics of the first version of this analysis; others see it as hair-splitting about the meaning of words. Yet if students are to make value judgments based on evidence, rather than naïve criticism, of their practice schools and (possibly more important) of their acceptance of a school's offer of a first post, they need to be competent in philosophical disciplines of thought, particularly in moral matters and in ethical considerations which enter into the organisation of schools as into the heart of all Biology teaching.

Criticism was also made of the phrase "unique nature of science, of biology" on the grounds, now well-trodden, that there is no such thing as scientific method, always excepting that few disciplines can use replication as empirical confirmation as much as the exact sciences can. What was intended here is a critical consideration of what aspects of science and Biology are important in the curriculum and which of their objectives may perhaps be better attained by other disciplines; there is no exact answer, but this does not make discussion of the matter any less important.

The suggestion that team teaching should be used in this category was

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* Bloom B S, 1956, (ed) *Taxonomy of Educational Objectives. Handbook I. Cognitive Domain.* McGraw Hill: New York.

greeted with cynicism - but there are colleges* where theoreticians and practitioners actually do this, and where the philosophy of education is made significant, relevant and comprehensible.

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* In the Faculty of Education, King's College, during the 1973 Introductory Course, methods tutors presented a series of video tapes of lessons to students and foundations tutors in two whole day sessions. Group discussions were led by foundations tutors, then students regrouped with their method tutors for further discussion. Informal co-operation between theoreticians and pragmatists occurs throughout the course.

CONTENT OF COURSES TAUGHT

21 Premises

(a) All students spend a three-week *preliminary practice in a primary* school so that they may have some knowledge of the informal methods used and the orientation of the pupils when they come into secondary school. There are some who think that this experience should come after the student gains some knowledge of child development (physical, emotional and intellectual); it is usually a matter of administrative convenience which decides the issue.

(b) The choice must *accommodate* the factual needs of students who have taken *a wide variety of degrees*. Tutors must be aware of deficiencies in their students' knowledge due to specialisation and provide facilities for individuals to remedy this.

(c) Many students feel *insecure in all but their main subject* area - although in Biology they are more accustomed to interdisciplinary work perhaps than in other sciences.

(d) Students often emerge from University Biology courses confused by a mass of particular evidence and quite devoid of a simple frame of reference on a variety of topics - this is particularly obvious in sixth form teaching, and if not dealt with in the initial training year it tends to produce a vicious circle. To expect them to sort out basic concepts without a tutor's help is unrealistic. Such work is also valuable for inservice updating for teachers.

(e) The course should produce students *willing to tackle all ability ranges* found in the schools in which they are likely to teach, from the age range *9 to 19* and also the rather different problems found in colleges of further education.

The basic skills of teaching are the same whatever the age and ability of the learner between 9 and 19; namely, communication by selection from a variety of methods to achieve objectives appropriately selected. Variation of pace and choice of complexity of conceptual hierarchies must necessarily vary with the intellectual age of the student - but the University science lecturer who can communicate at PhD level and also with nine-year olds is by no means rare, certainly not in the biological sciences.

(f) Students often have *stereotypes of good teaching* methods - the most frequently used are those that, if either *lecturing or practical work* is used, pupils are learning.

CONTENT OF COURSES TAUGHT

22 Attitudes and values

Away from:

- uncritical use of standard texts and O level and University notes
- the inability to teach Biology integrated with other sciences and mathematics or even to teach aspects of Biology which were not included in their University course
- an inability to teach anything but Biology and an unwillingness to integrate it into broader contexts of interdisciplinary work outside science*
- uncritical acceptance of the form and method school Biology courses

Towards:

.1 An appreciation of the need for and ability to *define basic concepts* at different levels of complexity.

.21 A confidence in their ability adequately to *cover the range of* materials included in *lower school science* curricula.

.22 To integrate them into a general framework of related knowledge. (Further needs in this category will have to be met in the probationary year.)

.3 A *critical appreciation of the content and method* of a variety of courses.

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* An increasing number of students with degrees or interest in the behavioural sciences may well necessitate more formal courses with a view, for example, to allowing a Biology specialist to teach on a liberal studies team, where work on evolution of man, physiological and psychological sex education, could benefit from specialist knowledge.

CONTENT OF COURSES TAUGHT

23 Knowledge

.11 The student should examine attempts to *organise knowledge into hierarchies* of complexity and generalisation which are suited to different age and ability levels.

.12 The student should know the *normal range of mental abilities and mental skills* to be expected from school children of different ages and backgrounds.

.21 The student should have a *full range of factual knowledge* required for lower school teaching programmes (or knowledge of where to find the factual information required). This entails filling 'factual gaps' left by specialist undergraduate education, e.g. providing facilities for a student with a degree in Botany to learn about fish.

.22 The student should *examine the case for Biology as an integrated science* which itself forms part of interdisciplinary education (i.e. integrating not only the sciences but also the humanities).

.3 The student should know about *current curriculum reform projects* and should be able to relate them to the philosophy (see also 16) which lies behind them, thus perceiving them as a means to an end rather than as an end in themselves, e.g. that Nuffield O level Biology is not merely a succession of recipes and techniques but has a *conceptual and methodological basis* which deserves critical examination.

CONTENT OF COURSES TAUGHT

24 Skills

.1 The student should *attempt to construct hierarchies* of knowledge and integrate them into school curricula so as to make a progression for the pupils (from year to year where this is needed) and also to facilitate comprehension, e.g. of genetics at both specialised and general conceptual levels.

.2 The student should be able to *make a critical selection of cognitive objectives* for any given course, relate course content and method to them and then plan a course within the constraints implied by any given situation; e.g. he can try to find better reasons for teaching about bulbs, corms, rhizomes and tubers than that it is required for examinations.

.3 The student should *attempt the criticisms of existing curriculum reform projects:*

- from the point of view of conceptual analysis and the structuring of hierarchies of concepts
- in evaluating the effectiveness of methods used to communicate basic facts and concepts
- in evaluating methods used to attain objectives other than those in the cognitive field

CONTENT OF COURSES TAUGHT

25 Methods of teaching and learning situations

.11 Students take part in *discussions* which aim to *produce* putative *schemes of basic concepts* on a variety of topics with particular attention being paid to areas which present special difficulties, e.g. molecular Biology, energy transfers. The results are used in schools where possible.

.12 Students *attempt to programme hierarchies* and where possible *use them* in schools. Since this is rarely practical, students are asked to base their project work on an analysis of concepts which are designed so that the work is capable of being taught at three ability levels (see Assessment 27).

.13 There is need for *background information on the development of learning abilities*. It is suggested that a formal course of lectures in child development is not the best way of doing this; the methods used will depend on the tutor concerned.

.14 *Practical application* of such knowledge is gained *by* working for *a period in a primary school and with* a master teacher of *least able children*. Most students are aware of the abilities of the able child as it is from this group that they themselves have come.

.21 *A subsidiary course* in teaching *physical sciences* in the lower school and also with reference to the Nuffield Physical Sciences A level material and its relevance for Biology. This work can only be introductory and should be further extended in the probationary year.

.22 Provision is made for *individuals to fill the gaps* in their biological knowledge usually by provision of analysed *resource material*, followed up by a *tutorial* if necessary.

.23 Students are given and encouraged to *construct concrete examples of* the *integration of other sciences* and Mathematics into Biology teaching, e.g. aerodynamics of birds, physical chemistry of osmosis and digestion, power output of human beings, at the lower school and less able level as well as sixth form.

.24 *Curricula are examined* which integrate Biology with other disciplines, e.g. the humanities curriculum project, the environmental studies syllabuses.

.31 *A variety of methods are* used *to acquaint* students *with* the *philosophy* of *the many curriculum reform projects;* those which are most relevant may have a member of the team concerned with the work brought in for discussion, or students may have a short course together with an overall picture of what each project seeks to do and where it fits in (or not, as the case may be) with the others. School Council's report of the RSLA conference is useful here, but does not include, e.g., the 9 to 13 project.

.32 Conceptual and methodological *analysis of the projects* as a basis for

criticism.

.33 *Rehearsal of new* experimental *techniques*, visual resource materials and ways of programming information from these projects both in college and in practice schools where possible.

CONTENT OF COURSES TAUGHT

26 What is to be assessed

.11 The extent to which the student is able to *provide a clear conceptual frame of reference* in Biology teaching.

.12 The extent to which the student is able to *select material suited to the ability level* of his class.

.21 The extent to which a student is *secure in the biological knowledge* he needs.

.22 The extent to which a student's teaching is firmly based on an *interdisciplinary* conceptualisation of *Biology* both *in* the context of the disciplines of *science and outside it*.

.3 The extent to which a student is aware of the basic ideas behind curriculum reform projects and where further work in any one of these is needed in the probationary year, depending on what kind of teaching post he secures.

CONTENT OF COURSES TAUGHT

27 Method of assessment

All categories:

By project work which, although flexibility is desirable, should have the following components:

- concept analysis of the topic to be taught at three different ability levels
- provision of a constructive, analysed methodological solution (including an indication of its place of integration within a piece of work, i.e. the aims, objectives, strategies and tactics involved in their consolidation and assessment) with as much originality as possible, to a teaching problem connected with this topic; preferably the problem is one which has arisen in the student's own first teaching practice
- production of teaching aids such as programmes, new experimental techniques, film loops, games etc

Preferably, the project should be taught at the three ability levels for which it is designed, but usually this is a practical impossibility. Making it practical would put further constraints on the selection of the topic - and flogging an unwilling student through an unmotivated project is a waste of everyone's time.

The project is available for external moderation.

All categories are assessed, at first by the tutor and teacher in school and later by the student himself *by* the student's *performance in school* as judged by visits and from lesson notes of work which has not been seen in action.

The student is helped to check his own successes and deficiencies with reference to the following factors:

- the level of complexity, pace and method at which the material is presented is appropriate to the ability level of the class
- data retrieval is comprehensive
- data are organised in a logical sequence of sufficiently small steps of learning
- the lesson leads the pupils to an appreciation of the concepts involved; it is not merely a collection of, for example, unrelated facts about amoeba
- the material is integrated with other relevant disciplines by the teacher

Long term assessment is rarely undertaken, except in a subjective way, and it would be useful if the predictive value of the project work and performance on teaching practice were the subject of intensive and organised study.

20 RÉSUMÉ OF CRITICS' COMMENTS ON CONTENT OF COURSES TAUGHT

To appreciate the content of education in secondary schools, the student needs to know what kind of knowledge and skills the pupils will possess when entering the school and what a variety of people think they ought to possess when leaving.

The positioning of primary practice (for graduates eventually specialising in secondary education) showed a polarisation of opinion:

(a) *It should be at the beginning of the course* as an introduction because it can, in schools where active learning methods are emphasised, delight University graduates since it is so different from anything they have experienced before; it helps to break down the stereotype of teachers as orators. Students are also amazed at the expertise needed and realise that teaching these days is for professionals, not gifted amateurs. They have their first experience of trying to communicate at simple language levels and meet a wide range of abilities and see a variety of teaching roles.

(b) *It should be at the end of the course.* Students lack the necessary psychological knowledge to make full use of their experience in primary schools. Students start by adopting a lecturing attitude which relates to their last experience in schools, i.e. sixth form. Students might *start* teaching practice in sixth forms where they could feel secure in the expertise of their degree (but what if the Zoology specialist has to teach sixth form Biology?) which would allow a gradual transition to more active learning situations. Then the student should deal with O level forms, CSE ability levels and finally those below CSE, ending with a three-week primary practice, which will enable him to see how his plans for the junior classes he will teach in his first post will fit with observed methods and techniques in the primary school.

There is much to be said for this point of view - students are amazed by primary schools and then further shocks are experienced in secondary schools which are so very much unlike their primary experience. The gradual shift in communications techniques also commends this view for further consideration. On the other hand, the state of mind of many students on entering teacher training militates against this idea. Facing a class needs 100% security both in basic factual principles and in self-image, and it is with the sixth form that these are often shown to be lacking in new graduates. Boys' sixth forms in particular may resent a student who appears little older than themselves, but has successfully overcome the hurdle of the academic rat race which for the sixth has only just begun; girls' sixth forms tend to less persecution of student teachers and greater interest in their personal attributes and relationships!

A further criticism of this section was that teachers capable of good work with all ability ranges from 11 to 18 were a supernatural phenomenon; most readers, however, agreed that there were even people who could work the range from 7+ to postgraduate! This premise was put into the category of 'Content of Courses' because the choice of content and the hierarchies of concepts in Biology obviously belong here, and both depend upon the mental development level of the pupil. Nevertheless, the crux of the

matter is the use of appropriate communications skills, given that factual knowledge is adequate at all levels, and so perhaps this would have been better placed in Category 3 'Classroom Techniques'.

Others thought that the construction of conceptual hierarchies and concept maps was too recent a development to allow for simplification for aspects, but at a simpler level hierarchies are indicated in the Combined Science Project and Nuffield Secondary Science Project (e.g. Field 7:5 which deals with radioactivity, sets out schemes for different ability levels in some detail). Both projects use concept teaching in the form of circuses, where by experiencing different manifestations of the same category or concept (e.g. energy transfers) Bloom's* objective of comprehension is by-passed and the pupil proceeds from knowledge to application. So one cannot eliminate concept work from this analysis, and at least students can learn to differentiate between a concept and a multifactorial situation: there are an inordinate number of texts, including Nuffield O level Biology which consider respiration as a concept (which indeed it is when defined precisely as a particular form of release of energy) and then structure experience to indicate that respiration can be equated with gas exchange systems.

Finally, a comment on the rehearsal of new biological experimental techniques in school and college. A middle way has to be trodden carefully in this matter; on the one hand students need to use a well equipped laboratory in college which may set standards in organisation and equipment that schools cannot achieve, while on the other hand this is a situation of unreality, and students need time to rehearse the experiments which they will actually teach in the very schools in which they are to teach them, and under the constraints of the situation. Nuffield Biology in a classroom or a hut can be organisationally impossible for a student with little instruction on how to deal with such situations.

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* Bloom B S, 1956, *ibid.*

30

Classroom Techniques

CLASSROOM TECHNIQUES

31 Premises

(a) The *appropriate technique* for any teaching situation will be *dependent* on a large number of variables, some of which are dealt with in other sections of this analysis. These include:

- the material to be taught (21 etc)
- the skills of the teacher and his insight into them (61 etc)
- the abilities and interests of the pupil (21 etc)
- the educational philosophy adhered to (11 etc)
- the material facilities available
- the time available for preparation and teaching

(b) Too many young people emerge from schools and colleges feeling that they are failures. *Failure and success are relative terms* - the same work can represent a considerable achievement for another. It can, therefore, be difficult for a teacher to praise and encourage success in pupils at an appropriate level, especially if he has little or no knowledge of what to expect from them.

(c) In less able classes, feedback is often sufficient for the student to be able to judge the success of his methods; conversely, in sixth forms and O level classes, many pupils will learn in spite of the teaching methods rather than because of them. Sensitivity to and *intelligibility of immediate feedback* are, therefore, important factors.

CLASSROOM TECHNIQUES

32 Attitudes and values

Away from:

- employing a *small range* of teaching *techniques* and class groupings, acquired mostly from their own experience of being taught; this is maybe applied uncritically, unimaginatively, as though there were no choice
- thinking of a *class as a homogeneous entity* with respect to, e.g. learning pace
- expecting pupils to learn with *motivation similar to* that which the *teacher* once responded to
- a stereotype of the teacher only as an infallible fount of information and the *pupils* as *massive* recipients of this benison

Towards:

.1 The student feeling ready to draw upon a *wide range of teaching techniques*.

.2 Perceiving the *class as individuals* with varied attributes, who may be grouped in a variety of ways to further learning processes.

.3 A realisation that the influencing of *pupil motivation* is a central concern of the teacher's job.

.4 Following from this last, an appreciation of the importance of *active* involvement of the *pupils* in learning processes; this includes activity of the brain as well as of the hands and eyes.

.5 The importance of the *pupils* enjoying their work and *experiencing success* at school whatever their abilities and aptitudes.

.6 Seeing the need for obtaining immediate valid and *sufficient feedback* as to the efficiency of his methods.

CLASSROOM TECHNIQUES

33 Knowledge

.11 The student should have knowledge of a *variety of* individual and group *methods* of structuring learning situations, including team teaching and programmed learning of all kinds.

.12 The student should know the mechanical and educational uses of a wide *range* of teaching *hardware*.

The student should know about the various factors involved pertinent to the understanding of the dynamics in a classroom. This includes:

.21 The *range of* emotional, intellectual and physical *development* encountered in chronological age groups.

.22 Small group psychology.

.3 *Varieties of motivation* including social motivation.

.41 The reasons why a *passively learning* class is rarely to be desired.

.42 *Methods of communication* so that active involvement may be achieved, including social perception (including restricted and elaborated codes of speech), visual perception and symbolism.

.5 .6 Ways of *structuring* non-verbal, verbal and written immediate *feedback* and of ascertaining that pupils are experiencing success according to their aptitudes and abilities while nevertheless being encouraged to extend them.

CLASSROOM TECHNIQUES

34 Skills

.11 Students should be skilled in as many *different classroom methods* as time and circumstances allow.

.12 Students should be able to *run* a variety of *machines efficiently*, and understand their basic principles so that they can cope with technological advance.

.21 Students should begin to *apply* theoretical *knowledge of development* ranges to individual pupils and classes.

.22 Students should improve their ability to *structure groups* within the class in *different ways* to achieve different objectives.

.3 The student should *use motivation* in a way which leads pupils *effectively* to attain the desired educational objectives rather than too frequently relying on gimmickry to produce superficial excitation.

.4 The student should be skilled in *communicating via a range of media and sense modalities* - verbal, written and visual. He should also become skilled at using and interpreting visual and social cues between himself and his pupils, such as facial expression and tone of voice.

.5 It will take a long time for secondary school pupils to come as willingly to school as so many primary children do now - to expect the student to achieve skills in helping his pupils to *experience success* is somewhat *unrealistic* except in academic objectives. He should, however, develop his skill at *creating learning situations* which are appropriate to the mental age and cultural background of the pupils but which can also extend the background and possibly raise the mental age.

.6 He should become skilled at creating a situation which gives him immediate feedback about the effectiveness of his work and become *adept at modifying* his *approach* accordingly.

CLASSROOM TECHNIQUES

35 Methods of teaching and learning situations

All categories are learned on teaching practice, with immediate tutorials by tutor and school teacher designed not to 'assess' the student but to point out his strengths as well as his weaknesses - using possibly a checklist similar to that in 27.

.11 *Diagnosis* of student's initial attitudes to teaching method by, e.g. an essay on his own previous education and the expression of value judgments about it (see example, Appendix D).

.121 Variety of methods studied by *observation* of film, video tape, some reading and by provision of resources so that the students may try them out *in practice*, and adapt them to the needs of the pupils, the school and himself.

.122 Formal *training in the use* and maintenance of a range *of* teaching aids - projectors, duplicating and copying machines, teaching *machines*.

.123 *Production and* critical *use of* a variety of audio-visual *aids*.

.21 *Background knowledge of* physical, intellectual, emotional and social *development;* the *relevance* of this knowledge to the learning situation is made clear using concrete examples, e.g. of types of teaching needed when Piaget's level of formal operations has not been reached.

.22 *Background knowledge of small group dynamics made relevant* by examples, e.g. on video tape knowledge in practice.

.3 Background knowledge *of* factors involved in *motivation* and evaluation of the use of this knowledge in practice.

.4 Background knowledge of *communication theory,* including linguistics, visual symbolism, etc. Film and video tape are used as a basis for observation on facial expression etc. The work is made relevant to classroom practice, e.g. by constructing worksheets in a restricted code of speech, by evaluating the use of models and visual symbols.

.5 Possibly the most useful method here is of *apprenticeship to* a master teacher of the less able, in a school where experiencing success is an important educational objective for the pupils. From the point of view of the students' experience of success with less able children, such an apprenticeship is an essential prerequisite before they take full charge of such classes.

.6 All *methods* of getting feedback are *examined,* as well as the usual tests and examination work, e.g. that feedback must come from the whole class rather than only the vocal few means that the student must use appropriate methods of communication to this end.

CLASSROOM TECHNIQUES

36 What is to be assessed

All categories: the efficiency of a student's communication

- *the adoption of the appropriate vocabulary,* verbal, visual and social
- *the adoption of the appropriate teaching style,* e.g.
  appropriate previous preparation by class
  correct assessment of previous knowledge relevant to the lesson
  introduction - with appropriate level and form of motivation
  - with clearly set out intentions
  establishment of facts and concepts by:
  - lecture, unstructured*, no feedback
  - lecture, using questioning, to and from class
  - lecture with pre-test questionnaire and discussion
  - demonstration by teacher
  - demonstration pupil-assisted
  - demonstration pupil-designed
  - investigation, recipe following
  - investigation, problem solving
  - investigation, pupil-motivated, may need asquisition of new techniques and skills
  - visual aids, used instead of the teacher, i.e. teacher passive
  - visual aids, used by teacher, class passive
  - visual aids, active involvement of class, with or without teacher
  - discussion, teacher leads
  - discussion, teacher controls
  - discussion, class leads
  - discussion in small groups, reporting conclusions back to whole class
  consolidation - verbal or written questions
  - visual methods, e.g. models made by class
  - reinforcement, other than by simple recall
  - by practical application
  - by synthesis, e.g. use of examination questions
  record of work - dictation, gap-filling
  - structured by teacher on board or worksheet
  - common record by discussion, corrected by teacher and class
  - individual record
  whole class teaching, individual or group work

And in addition:

.12 The students skill in using a range of teaching hardware.
Adequacy in rehearsal of techniques and aids.

.123 Possibly software production.

.3 Extent to which pupils are motivated towards and involved in active

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* Some people prefer the word 'oratory'.

learning (checklist).

.3 Rating on a five point scale the effect the student has had on the motivational level of the class
- he has intelligent and active co-operation of the class
- he has evoked a good response to discussion or practical evidence, allowing the lesson to be built up effectively
- class passively receptive
- class uninterested, passive and apathetic
- class antagonistic and antipathetic

.6 Ability to modify from feedback.

NB: It is beyond the powers of most students to shift a class from antagonism to co-operation, hence this rating must take into account the status quo of the class.

CLASSROOM TECHNIQUES

37 Method of Assessment

All categories:

The objectives of assessment in teacher training can be broadly stated as follows:

Classification of the abilities of a student teacher for use by authorities in deciding (a) whether or not he shall continue his course, change it, leave it and (b) his suitability for a teaching post.

Helping a student to an awareness of his own particular skills and abilities as well as his deficiencies.

Giving tutors and school teachers alike some feedback as to the effectiveness of the course which they are providing.

In assessing classroom skills, too much attention has been paid to a secretive form of (a) and not enough to (b).

Hence the method of assessment here is designed to help the students increase their awareness and should be used as such. It might also help in providing valid feedback as to the effectiveness of the course.

Therefore, all categories are assessed on *teaching practice* by the student in conjunction with the tutor and class teacher, and where possible by means of video tapes of the student's lessons, although this can impose an intolerable strain on some students. The assessment should leave the student in no doubt as to his *abilities to select and execute appropriate techniques*.

In addition:

.12 In London, some students are assessed by taking the *ILEA Certificate course* in visual aids. There is a need for some nationally recognised criterion in this respect.

.123 Production of *software* may be assessed in the *project*.

.3 Discussion of checklist with student, teachers etc.

.3 .6 [Discussion with all observers (see also 67.1).

30 RÉSUMÉ OF CRITICS' COMMENTS ON CLASSROOM TECHNIQUES

This section aroused little criticism but provoked much stress on two aspects: first, the importance of communications between teacher and class, without which valid feedback is impossible to obtain, and, second, the need for students to have some nationally valid certificate in the use of the audio-visual hardware associated with teaching.

On the communications aspect one wonders how much the postgraduate education year can, in fact, improve communications between classes and a student who has, for the last twenty-one years, been unlikely to communicate except with members of any but a relatively small number of groups. Here we have the tragedies of the teaching profession - sad people who spend their teaching time "Keeping the class quiet - I haven't really time to teach them much" and who perhaps wake up too late to the realisation that not only is teaching not for them, but that their teaching is not much use to their pupils. Perhaps we should try to identify such people while they are students, although there are many who, without special help, mature later to become good communicators. The convention that it is not respectable to be too friendly with pupils is still in use; to pretend to like pop groups and to try to appear trendy though middle-aged is unlikely to improve communications with a class, but, on the other hand, genuine shared interests and attitudes will help in the understanding of the particular cultural subgroups to which various members of the class belong. Perhaps we need a more detailed course on the anthropology of the British; where there are clear indications that a teacher is dealing with a culture different from his own, such as colour or poverty, the resultant awareness at least indicates the presence of a problem of communication, but where such overt signs are lacking teachers too often fall back on annoyed bewilderment that the class does not think exactly as they do, blaming the class rather than their own lack of insight. Generation gaps and children's rights movements all stem from lack of communication, and it is here that the young teacher finds most difficulty, especially if he feels he must indulge in whole-class teaching from the first and not structure small groups so that he can get to know at least some of the class as individuals, with different motivations, subcultures and learning speeds.

There is still some feeling that a teacher who fails to motivate pupils is in some way pandering to their desire for an easy life. Is this because those who make such comments were themselves compliant absorbers of whatever was placed before them by teachers and see no reason why others should not suffer similarly? Whether or not enjoyment is an acceptable educational objective, it would seem clear that a pupil's intellectual curiousity is more likely to be aroused and efficiently followed through if he is impatiently awaiting the opening of a seductive door to the extension of his knowledge and skills rather than being pushed unwillingly through it. Many of the early charities and social services were constructed in such a way that, in fact, they deterred those in need of help from getting it, unless they could endure humiliation and suffering - and it is obvious that this principle still endures in some of our educational backwaters.

But the worst effect of deficient communications is in obtaining feedback as to the efficiency of the learning situation provided, not only from the vocal and bright members of the class but from those in the middle of the ability range, who are so often neglected. (Those who

are *least* benefiting from the lesson usually provide feedback in unequivocal terms!) This leads to the situation of teachers being unaware that their pupils may be learning in spite of their teaching rather than because of it - cynically expressed by one critic as "Twenty years repetition of the first year's teaching experience". If educational methods are to respond to changing societies - and nothing is more sure than that we can expect continuing and accelerated change - then feedback is vitally important. It is still regarded in some quarters as being lèse majesté for teachers to indulge in such operations as obtaining pupil evaluation of their lessons, and the principle of pedagogical omnipotence still operates. Many, however, feel that honest feedback, even when it hurts, is the most exciting part of teaching and can be compared to the feelings of fear which rock climbers experience, without which the exercise itself becomes pointless. Living in an uncritical vacuum is often an escape for those without a secure self-image, and it is this which a teacher needs to possess above all things, and which no programme of training or education can provide unless the student's previous conditioning gives a firm foundation on which to build.

As to the need for a nationally valid certificate for handling teaching hardware being obtained during the training year, it is the strategies and tactics of providing such courses which are the stumbling blocks. Departments cope with the situation in a variety of ways, some allowing, say, ten minutes on a 16mm film projector, and similar time on other machines, and hoping for the best; others leaving it totally to the school or LEA in the student's first post. Others send their students to outside institutions which specialise in such work, which seems sensible from the point of view of national expenditure on equipment and staffing, while leaving the educational use of the machines to the internal staff of the department.

In several authorities, students on practice are not allowed to use hardware without training and hence much of the point of teaching practice as providing practical experience in the educational use of teaching aids is lost. Such deficiencies may never be made up in later school experience, as schools vary widely in the amount of aids which are available for use. Thus this contributes to a nationally low level of using aids which are often thought of as teacher's rest rather than as an aid to active learning with pupil involvement; their use as an anaesthetic (aided by classroom blackout and concomitant poor ventilation) is well known - some schools merely ordering batches of unselected films to cope with the troublesome periods after exams or at the end of term.

A nationally valid certificate of competence, allowing much time for practice and also endorsing usage during the teaching practice period would save much wastage of effort and ensure a higher standard of the critical use of such expensive machinery.

40

Integration of Content and Techniques

INTEGRATION OF CONTENT AND TECHNIQUES

41 Premises

Too often content and method are divorced and a conscious effort must be made to synthesise them.

(a) Students often spend so much time mastering facts and arranging concepts that they give little thought to the variety of methods which can be used to establish and reinforce factual matters. They need to consider, for example, when investigation is the most appropriate method, when a theory can be derived from observed facts, or, conversely, when a theory must be introduced first and then applied practially.

(b) Judgment by the student's peers as well as his superiors is an effective learning situation for all but the most sensitive and is of use also in assessment.

INTEGRATION OF CONTENT AND TECHNIQUES

42 Attitudes and values

Away from:

- overemphasising some educational objectives, such as acquisition of information, and disregarding others, such as self-sufficiency of pupils
- assessing only those objectives for which there are traditional assessment methods
- regarding the content of courses as self-justifying
- having no concept of cost-benefit applicable to education

Towards:

.1 *Defining objectives* in all aspects of education and *adopting* effective means of achieving them.

.2 *Continual evaluation* of the *efficiency* of educational procedures in achieving objectives (assessment).

.3 *Evaluation of alternative strategies* and procedures in *terms of* technical soundness, administrative *convenience and cost*, school policy and social acceptibility.

INTEGRATION OF CONTENT AND TECHNIQUES

43 Knowledge

.11 The student should have a *conceptual model* of education which allows him to relate its various objectives and assess their priorities.

.12 The student should *know how to analyse lessons*, sequences *and curricula*, in terms of a variety of procedures by which the objectives may be achieved.

.21 The student should *know of a variety of forms of assessment* of cognitive and behavioural achievements by his pupils.

.22 *Knowledge of procedures* used by various bodies in CSE, O level and A level examinations and the use of statistics.

.3 That *time/money/cost/benefit analysis* can be applied to teaching methods and objectives.

INTEGRATION OF CONTENT AND TECHNIQUES

44 Skills

.1 The student should become *skilled in matching* selected *objectives with* appropriate *methods*.

.21 The student should be *able to construct* the *means of* maintaining and *improving* his *own performance* and should come to do so.

.22 The student should be *able to use a variety of* assessment *methods to determine the achievement of his pupils*.

.3 The student should eventually develop the *ability to co-ordinate* all *educational procedures* so that they form part of an integrated strategy.

INTEGRATION OF CONTENT AND TECHNIQUES

45 Methods of teaching and learning situations

.1 Students at first analyse each of the lessons which they give in three categories:

matters explored	methods used for first introduction	methods used for consolidation, extension

and later add the categories of aims, objectives, strategies, tactics and evaluation.

.21 Students *criticise* their own and others performance in lessons, *using lesson notes and video tapes*.

.221 Students *criticise, construct and use procedures* for assessing cognitive and behavioural achievement of pupils.

.222 Students *use and criticise* in discussion and writing *standard assessment schemes* from CSE to postgraduate certificate in education.

.223 During practice, students *assist in setting and marking school examinations* and assist in the laboratory preparation of external practical examinations.

.3 Students *criticise* in writing and discussion their own and others simulated curriculum schemes *in terms of time/money/cost/benefit*.

INTEGRATION OF CONTENT AND TECHNIQUES

46 What is to be assessed

.1 Analysis sheets of each lesson are of a reasonable standard.

The following checklist of what may be assessed in some special situations is to help to make the student aware of the problems with which he may be confronted, rather than a scheme of assessment for all students in all schools.

Teaching least able pupils. Assessed under five headings:

- class motivation both form and strength
- appropriateness of pace of learning accommodated
- number and type of opportunities for success offered to the pupil
- critical use of behavioural objectives
- critical use of method, reinforcement and evaluation

Teaching pupils in a laboratory for the first time. Assessed under four headings:

- the appropriateness of his vocabulary
- skill in motivating pupils
- skill at organising the class and controlling the pupil's behaviour
- selection of behavioural objectives for the class

Teaching a sixth form. Students should be able to use a variety of methods selected from the following:

(a) a variety of lecture techniques (36)
(b) integration of relevant practical with theory
(c) teacher-structured work at individual pace, integrating use of all aids (textbooks, visuals, practicals), teacher is used as a tutor
(d) pupil-structured work at individual pace

(The two most common complaints of University teachers is that students fresh from sixth forms are unable to take notes other than from dictation, and are unable to organise their own work without constant reminders.)

A revision lesson. Assessed on these factors:

(a) factual gaps diagnosed only
(b) pupils allowed to recognise but not recall what they are supposed to have learned
(c) pupils recall exercised, verbally or passively
(d) pupils recall achieved by a variety of activities demanding involvement
(e) pupils synthesise knowledge (e.g. answer an O level question) as well as recalling it in discrete parts

Museum visits or field work etc. Assessed under three headings:

- the extent to which the pupil's work is integrated with their course
- the extent to which behavioural objectives are incorporated
- the extent to which the pupils are actively involved in learning

Team teaching. Students should be able to select and use the appropriate techniques:

(a) main motivating/introductory session followed by group work or discussion
(b) individual programmes constructed by team who then act as tutors to group
(c) combinations of (a) and (b)
(d) interdisciplinary co-operation, but taught by individual teachers

.2 Using effective methods of assessment for himself and his pupils.

.3 That students are aware of time/cost/benefit methods of assessing curricula.

INTEGRATION OF CONTENT AND TECHNIQUES

47 Method of Assessment

.1 *Teaching practice analysis* is assessed by:

(a) class teachers)
(b) college tutor) notes checked, lessons seen
(c) students own groups, notes checked, videos seen, lessons discussed

.21 *Assessment procedures* may be examined both theoretically (concise reports) or practically.

.22 Students need *further work on assessment procedures* during probationary year, e.g. knowledge of area boards' idiosyncracies, and detailed knowledge of one particular level, usually CSE, mode III.

.3 Not assessed on course - long-term objective.

40 RÉSUMÉ OF CRITICS' COMMENTS ON INTEGRATION OF CONTENT AND TECHNIQUES

Even less criticism was made of this section and, again, the comments indicated that the concept of student assessment by the students themselves is becoming regarded as crucially important by an ever growing number of people in the field of teacher education (46.2, 47.1).

The preoccupation of scientists with techniques without regard to their effectiveness in providing a learning situation is perhaps due to the large number of curriculum reform projects in science teaching which have emphasised active learning as opposed to didactic methods. While such reforms have produced many benefits, they have also had unfortunate results in promulgating the idea that if pupils are engaged in technical activities, they are also learning, and a breed of teachers has sprung up who are keen on attending new courses on techniques of newer, cheaper and more dramatic experimental work, but unwilling to think critically about objectives and their effective fulfilment, consigning all educational theory arrogantly to perdition. A similar breed of techniques merchants has sprung up with regard to educational testing and assessment, which for some has come to mean little but the construction of multiple choice questions, often testing only recognition of knowledge and the naïve application of statistical principles. Why any teacher should every assume that any class of 35 pupils should neatly fit a normal distribution curve is incomprehensible, but is, nevertheless, a frequent occurrence. Students need a basic course in the principles of assessment, both exact and inexact methods, and it was suggested in the analysis that knowledge of the examination board they would have to deal with in their first posts should be left to the appropriate LEA to arrange. Criticism suggested that LEAs would find it impossible to staff and provide such courses, and that it might be appropriate to suggest that the examinations boards themselves should do this work.

Finally, a brief comment on the uncritical use of video tapes in teacher education. There used to be a touching faith in those workers who attempted analyses of teacher/pupil interaction in lessons in the belief that a valid observation of what was seen and heard to be going on in the class between the teacher (solus) and pupils (en masse) would provide a valid basis for analysis of the learning process. This faith has now been extended and made even more superficial by the use of video tape evidence as a basis for such analysis. Neither method takes much regard for what is going on in the mind, nor of the variety of individual pupils' reactions to the same learning situation. At least one director of an educational CCTV unit has said that there is little point in trying to televise individual learning projects, with their constantly dissolving sma'l groups, as neither microphones nor cameras are ever in the right place. The constraints of the medium, therefore, emphasise whole-class teaching, centred on the teacher with the radio-microphone, whereas more sophisticated techniques are needed for recording more varied teaching techniques if the medium is not to dictate the message. Students when televised, for example, often feel they have to put on an authoritarian, oratorical show for the cameras and know that they can rely on the novelty of the situation to promote class docility. But at least CCTV is better than the methods used by some professional film-makers where active learning situations must be repeated for close-ups and classes 'discover' something for the ninth time so that a better camera angle can be obtained! The resulting travesty of a situation can hardly be called an educationally sound piece of evidence. Unfortunately, good techniques in

this field are expensive, both on time and on hardware, but too few people seem to be aware that the present techniques are in fact providing only superficial evidence.

50

Organisation and Administration

ORGANISATION AND ADMINISTRATION

51 Premises

(a) The *students* have been used to working within a well organised administrative system in which they bore no responsibility for the organisation of equipment and supplies; consequently they tend to be *reliant on others* and on laboratory staff in particular.

(b) *Students* have *not* been *encouraged to question* the organisation and administration of the educational system.

(c) *Students* have *not* been *encouraged* to *question national educational policy*, whereas there is a need for informed criticism.

ORGANISATION AND ADMINISTRATION

52 Attitudes and values

Away from:

- being reliant on laboratory technicians for the organisation of biological supplies
- being ignorant of the whole education administrative system and not seeing any virtue in knowing about it
- having an unquestioned concept of the role of a Biology teacher which does not extend beyond teaching and the preparation of lessons
- regarding the various elements, e.g. teaching methods, assessment, administration, as discrete factors

Towards:

.1 Being *self-sufficient* in the *organisation* of biological *supplies*.

.2 Realising the importance of *understanding the administration* of the educational system.

.3 Having an awareness of the total *role of a professional teacher*.

.4 Regarding all elements as part of *a system*.

ORGANISATION AND ADMINISTRATION

53 Knowledge

.11 The student should know of the *sources, management and preservation of biological supplies* and livestock, e.g. Customs regulations on the supply of alcohol, timing of delivery of fertile eggs, deep freezing.

.12 The student should know of particular *dangers* associated with chemical and microbiological supplies, how to minimise them and how to cope with emergencies.

.13 The student should know of a variety of *laboratory designs* and the relationship of structure with function.

The student should know of methods of *organising work* in his laboratory for maximum safety and ease of movement, e.g. work study applied to the laboratory.

.14 The student should have some knowledge of *estimates* for both laboratory and field work and the use of petty cash.

.2 Background knowledge of the *structure* of the English educational system and its history relevant to science teaching.

Comparison with the systems in *other countries* is probably the best way of imparting this knowledge instead of being used as a reinforcement as it is generally at present.

.3 The student should know about the *career structure* of Biology teachers and the roles associated with different jobs, in the framework of the present system in this country and with reference to future developments.

.4 Science students are often overwhelmed with the practical details of day to day running of the laboratory and need knowledge to enable them to make *soundly based value judgments on* wider issues of educational *policy*, both within the school and nationally.

This knowledge should include examples of interaction between *financial, administrative and social constraints* on educational policy.

ORGANISATION AND ADMINISTRATION

54 Skills

.111 The student should be able to *organise* all aspects of work in *a laboratory efficiently* and apply his basic knowledge of laboratory design to improve its efficiency.

.112 The student should develop *administrative skills* in order to organise competently the financing and timing of biological supplies.

.113 The student should develop skill in the *human relationship* aspect of organising biological supplies (e.g. dealing with local butchers, his own lab staff, cleaners etc).

He may also need skill in later life in producing soundly based value judgments on *laboratory design* when working with architects designing a new laboratory.

.2 Students should be encouraged to develop skills in reading and *précising* the wordy *reports* and circulars which are often the instruments of educational policy, and should be skilled at *writing succinct, effective reports* on policy himself.

.3 Students should be encouraged to develop skills in choosing work which is best for his own career development and *contributing to an effective career structure* for the profession as a whole.

.4 Students should be encouraged to develop skills in *assessing* the effects of changing factors in the *ecology of the educational system*.

ORGANISATION AND ADMINISTRATION

55 Methods of teaching and learning situations

.111 Students are given, e.g. Fry J, *Biol. Educ.* (1968) 2, 53-61 or other available lists *of livestock supply* to work from and learn the value of *up to date knowledge*.

.112 Students are required to *order and obtain their own supplies* (e.g. go to meat markets, abattoirs, keep receipts etc) and have an expert available for consultation in case of difficulty.

.113 Students do written *exercise on ordering*, e.g. STEP* material.

.12 Students are made aware of laboratory *safety precautions* and expected to practice them in schools, e.g. knowing where main water tap, electrical switch and gas tap are situated. (Many teachers have been found not to know such facts themselves!) STEP material available.

.131 On *teaching practice* students have to *organise* and run *laboratory classes* including clearing up, preferably by the class, at the end of the lesson.

.132 Students criticise *video tapes* of laboratory *organisation* related to design.

.133 Students see *films* and *plans* of *laboratory design* and, where possible, visit schools and *meet teachers* who have been responsible for design.

.21 Background knowledge of the *educational system* here and abroad. A concise *programmed course* using film, handouts and questionnaires is generally preferred.

.22 Students may be given *reports to précis*, such as Swann, Dainton, *as a group activity* - the results being duplicated and available to all.

.3 Students visit a *variety* of establishments, meet students previously trained in the department, discuss *various unions* and their attributes with representatives.

.4 Interaction between parts of system should emerge in .21 and is often *dealt with informally* in discussion as matters arise.

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* Science Teacher Education Project, Universities of Reading and Leicester.

ORGANISATION AND ADMINISTRATION

56 What is to be assessed

.11 The student's *ability at organising* and accounting for *supplies*.

.12 The student's *ability at organising class work* in a laboratory, with *safety*.

.13 The student's *efficiency at simple laboratory skills* (Dr Clarke's checklist*) with appropriate training for individual inadequacies.

.21 The student's knowledge of *administration* and its procedures will only be assessed when he is in his first post, and perhaps not even then.

.22 Ability to write *concise reports* with supported value judgments can be assessed by *written methods*.

.3 *Long-term* assessment only is possible as a valid measure of the student's ability to act in a fully *professional role* and to choose work and his union circumspectly.

.4 Can only be assessed in long-term.

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* Appendix C.

ORGANISATION AND ADMINISTRATION

57 Method of Assessment

.1 The student's efficiency in all aspects of laboratory organisation is judged from information available from the laboratory technicians and the school staff, as well as from what the tutor sees, and this is used to help the *student to improve his performance*.

There are, however, cases occasionally of students who are a menace to life and limb in both laboratory and field; steps should be taken to safeguard their future pupils and schools.

.2 The student's ability to read and write reports may take part in the externally moderated *long essay*, or *concise reports* written for the GCE qualification (see 17).

.3 *Long-term* except that the student's ability to select work well is often illustrated by the *fall-out rate* from the profession in the *first two years*. This also depends on the existing career structure and the status of the teacher in the community.

.4 Long-term. Some are unaware of, e.g. processes of decision-making in the system after a life-time of teaching.

50 RESUME OF CRITICS' COMMENTS ON ORGANISATION AND ADMINISTRATION

Here, once again, present methods in teacher education seem to be ineffective in achieving much success, partly because the objectives in this field seem to be the vaguest of all. The history and administration of the English educational system and its comparison with other systems seem too often to reinforce stereotyped attitudes and concepts, as a consultation of many esteemed writers in this field will testify. An insistence on historical origins is certainly valuable, and if a clear way can be shown through the tangles of educational administration so much the better. But once again, as in the field of philosophy of education, the hypothesis that such work is better with the emphasis on comparative aspects must be made. This allows critical examination of the system the student has experienced without necessitating a detailed understanding of either history or administration, i.e. leading from knowledge to critical application, analysis and synthesis, rather than getting into a slough of unsynthesisable detail.

Administration, and particularly the processes of decision-making, is a necessity if the clarification of the teacher's professional stature and the nature of educational change is not to be left to those who, for example, in the light of the ROSLA experience, would appear to know least about it. Perhaps we need to promote the idea that more of the experienced teachers should make a career in educational administration, but many of these genuinely prefer to go on teaching, although the surest road to promotion is to transfer to administrative duties. Conversely it might be interesting if administrators could experience the results of their bureaucracy at first hand! Re-organisation of an effective career structure for the teaching profession can only come from an informed and critical body of its members.

60

Insight on Own Performance

INSIGHT ON OWN PERFORMANCE

61 Premises

(a) That the student's performance is enhanced and his education and potential improved if he has insight into his own personality, attitudes, skills and knowledge, both of his excellencies and his deficiencies. Hence the view taken in earlier sections that assessment should be used to this end primarily.

He should also have knowledge of his own physical, social, psychological and intellectual potentialities, and of where these are capable of extension and where they are not.

Anxiety neurosis is an occupational hazard of the teaching profession, and while it may be due to purely metabolic factors such as an increase in blood lactate levels, it is more likely to be influenced by attitudes to and knowledge of personal working pace. Some people work in short, sharp bursts with fallow intervals, while others prefer a steady amount done each day - what do they do when they are forced to change their preferred pattern? The postgraduate year is a very suitable situation for students to begin thinking about the action needed to be taken for "the preservation of the teacher", as one author puts it.

(b) That there is no such thing as the 'ideal teacher'. Each individual comes to terms with each class in a unique way. This does not entirely negate the use of 'observation' lessons, but to expect a student to acquire every facet of the teaching behaviour of any other individual, and in particular to take it as destructive criticism if he does not, is unrealistic.

INSIGHT ON OWN PERFORMANCE

62 Attitudes and values

Away from:

- teaching because he can think of nothing else to do
- no insight into his own behaviour or limitations

Towards:

.1 *Realistically confident person* who has, at the end of the course, either chosen to teach or chosen to leave teaching, and in either case accepts his own decision. In the first case he will have developed to a large extent the basis of his *own teaching style*.

.2 *Insight* into his own personality, philosophy of life and intellectual capacities, with an appreciation of the particular stresses placed upon them by teaching.

.3 An understanding of how to *care for and maintain his own mental and physical health* and of the part he has to play in forwarding the mental, physical and social health of his pupils and the whole community in which he lives.

INSIGHT ON OWN PERFORMANCE

63 Knowledge

.1 The student should have a critical appreciation of how a variety of people *come to terms* with a variety of *groups of pupils*.

.2 The student should understand the *basic theories of personality* development.

.3 The student should have a knowledge of *physical, social, psychological and pathological aspects of health* relevant to teaching.

.3 The student should appreciate the extent to which his *own health choices are subject to irrational influences*.

For example, the idealistic teacher who spends his holiday time not in having a well earned and essential rest of an appropriate sort but continuing on his school-driven treadmill in one form or another, while in contrast the lazy teacher who suffers from guilt feelings that perhaps someone will discover his sins: both may succumb to anxiety. For the student it is valuable to point out the stresses which will exist in the first year of teaching, possibly based on the checklist from Holmes, Professor of Psychiatry in the University of Washington; many students add to the strain of the first year the strains of marriage.

INSIGHT ON OWN PERFORMANCE

64 Skills

.1 The student should appreciate the variety of acceptable roles which can be played in the classroom. He should be able to select his *own approach* to a variety of classroom situations with confidence and be able to *play certain roles** when and where they are needed.

.2 The student should learn to deal with *insight* into himself, while *avoiding neurotic self-criticism* and persistent obsessed self-criticism.

.3 He should be able to put his knowledge of health matters *into practice* without being *hypochondriacal* or crankily obsessed with them.

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* *Implementation.* This analysis demonstrated the need for an edited video tape showing a variety of teaching roles and personalities among practising Biology specialists. Such a tape was made, showing both students in training, young teachers and experienced practitioners teaching a variety of ability levels from low ability 14-year olds to members of a 120-strong Biology sixth form. (This particular sixth form was taped when being taught not only by their regular teacher but also by a student in training.) When shown in the introductory course, student reaction was primarily one of amazement that those students on tape actually knew their facts. (As a matter of fact, they didn't - they simply put over inaccuracies and biological half truths with a confident face and voice!) Facts and discipline are the two main worries of the new student - one commented that he thought the noise had been edited out of the tapes or not picked up by the microphones, hence he had considered that the noise levels of his own lessons (well above the preferred working hum) were conforming to the accepted norm. One section of the tape shows a student teacher hanging precariously on to the balance of power, as he efficiently bores the class with dedicated thoroughness, and hence provides some good evidence about 'discipline', imposed variety.

INSIGHT ON OWN PERFORMANCE

65 Methods of teaching and learning situations

.1 Students are encouraged to observe all kinds of teachers and to *develop their own style on teaching practice.*

Teaching practice, after the initial stages are over, does give more time to students for preparation than they may ever have again. This should not be regarded as an unrealistic preparation for a future job but as a time when students are able to teach at a higher standard than they may ever be able to attain in professional life, at least at the beginning of their careers. (The converse, of course, could also be true!) There are some schools which give a young teacher in his first post a light timetable to begin with, so that he can keep up his high standards, but these are few.

Students see *acknowledged experts* teaching at all levels, live or on video tape.

.2 *Background knowledge* given in *psychology* and *philosophy* and applied when appropriate.

.3 *Programmed course in health* matters, using film, video tape, discussion, questionnaires.

Checklist of facts and concepts.

.31 *Facts:*

.311 Of the occupational hazards of the teacher.

.312 Of the steady state of the internal environment.

.314 The energetics of diet and its cultural, emotional and social aspects.

.315 Adapting to the changing internal and external environments.

.316 Of the physical basis of human behaviour, e.g. in adolescence, relevant knowledge of genetics.

.317 Of the human life cycle.

.318 Of where to draw the line in First Aid!

.319 Of deprivation and death.

.32 *Concepts:*

.321 Human *variation*.

.322 The causes of human behaviour are always *multifactorial*, hence health education must be a synthesis of relevant disciplines and

not merely biological.

.323 Selection pressures are at work in urban societies - *survival values* change with changing environments.

.324 Less need for concern about physical health - more on the *social and psychological aspects*.

.325 Following on the last point, *frustration of basic human drives* is the underlying disease of which health problems such as drugs, smoking, alcohol, aggression, promiscuity etc are only the symptoms.

.326 Irrational health behaviour may be due to drive frustration but is also due to human optimism and lack of appreciation of the *laws of probability*.

.327 *Trend towards co-ordination of health* and social services, of teacher contacting parents in home, of psychiatric treatment of the whole family, not the patient alone.

.328 *Trend away from institutions* - for the elderly, for the physically handicapped, for the mentally handicapped.

INSIGHT ON OWN PERFORMANCE

66 What is to be assessed

.11 The insight, level of sophistication and the accuracy with which a student is able to *criticise* his performance.

The way in which he responds to outside criticism.

.12 The performance itself *depends* upon his physical, mental and
.2 social *health* as well as his level of insight, and hence *an exact*
.31 *assessment is rarely possible.*

.32 *Implementation of knowledge of health matters.*

INSIGHT ON OWN PERFORMANCE

67 Method of Assessment

.1 Students rated by themselves and their tutor *on these four points:*
.2

- no criticism required as student is self-monitoring and able to strike a balance between hyperself-criticism and short-term pragmatism
- accepts criticism and acts upon it
- produces counter-arguments to criticism but subsequently acts on it
- no improvement after criticism

.3 The real assessment is the *long-term application* of health education principles in the student's personal and public life.

60 RÉSUMÉ OF CRITICS' COMMENTS ON INSIGHT ON OWN PERFORMANCE

Student teachers, with the exception of a few happy souls living in their own insulated realm of unreality, are going to be anxious about their own performance. Help in this matter has often been refused on the grounds of encouraging morbid introspection. Like many other objectives in teacher education, introspection should not be regarded in black and white terms, but as a continuum of behaviour necessitating a careful treading of the middle way. Students, therefore, must be helped to make beneficial use of their natural anxiety and at least be given enough security in their own self-image to feel no shame in asking for help.

Students' performances depend on their own physical, emotional and social health and also on their knowledge of the physical basis of human behaviour (both of themselves and of their pupils); this has been lost sight of in many health education programmes directed at graduates in training for teaching. They are assumed to have acquired such information previously in an educational system which, until recently, only gives knowledge of human body care and maintenance to those intending to enter the medical and allied professions. There are exceptions to this rule, which are fortunately becoming more and more common, but meanwhile a 'potted' human Biology course is essential for students, rather than equally potted histories of the school health services. That health education has previously had an image of people chewing nuts, wearing sensible shoes and saying "don't" may be true, and it is perhaps not surprising that few departments have health education courses, preferring to think that First Aid and its application to laboratory and PE circumstances are enough. Health Education aimed at the preservation of the teacher, with the emphasis on factors contributing to stress in both teachers and pupils has proved, to King's students at least, worth attending even as the last lecture on the last Friday afternoon of term. An inexact evaluation, perhaps, but a valid one in this field of knowledge.

Postscript April 1976

Six years after the original design, I feel it is valuable to write an evaluation of the course design and its subsequent modifications. Such an undertaking cannot be in time for this publication, but it is intended that it will take the form of anecdotal research, giving the results of:

(a) interview and selection procedures, including school placement for teaching practice
(b) student's previous education, attitudes, expectations
(c) the introductory junior school practice
(d) first teaching practice, student in school assessment
(e) theoretical term
(f) second teaching practice
(g) student's attitudes and reactions at the end of the course
(h) assessment - formal and informal

Having ploughed through all this lot, I hope readers will feel able to tackle it!

Dorothy Dallas

Appendix A1

ASSESSMENT OF STUDENT TEACHERS - Dorothy Dallas, King's College London, (1971)

A OBJECTIVES

The objectives of assessment in teacher training can be broadly stated as follows:

(a) Classification of the abilities of a student teacher for use by authorities in deciding (i) whether or not he shall continue his course, change it, leave it and (ii) his suitability for a teaching post

(b) Helping a student to an awareness of his own particular skills and abilities as well as his deficiencies

(c) Giving tutors and school teachers alike some feedback as to the effectiveness of the course which they are providing

In assessing classroom skills, too much attention has been paid to a secretive form of (a) and not enough to (b) and (c).

Hence the method of assessment here is designed to help the students increase their awareness and should be used as such. It might also help in providing valid feedback as to the effectiveness of the course.

Therefore, all categories are assessed on *teaching practice* by the student in conjunction with the tutor and class teacher, and where possible by means of video tapes of the student's lessons, although this can impose an intolerable strain on some students. The assessment should leave the student in no doubt as to his *abilities to select and execute appropriate techniques*.

B ASSESSMENT is initially by the tutor and teacher in school and later by the student himself *by* the student's *performance in school* as judged by visits and from lesson notes of work which has not been seen in action.

1 The student is helped to check his own successes and deficiencies with reference to the following factors:

- the level of complexity, pace and method at which the material is presented is appropriate to the ability level of the class
- data retrieval is comprehensive
- data are organised in a logical sequence of sufficiently small steps of learning
- the lesson leads the pupils to an appreciation of the concepts involved, it is not merely a collection of, for example, unrelated facts about amoeba
- the material is integrated with other relevant disciplines by the teacher

2 Students rated by themselves and their tutor on these four points:

(a) No criticism required as student is self-monitoring and able to strike a balance between hyperself-criticism and short-term pragmatism

(b) Accepts criticism and acts upon it

(c) Produces counter-arguments to criticism but subsequently acts upon it

(d) No improvement after criticism

Whatever the student's *theoretical ideas* may be, on teaching practice he is required to plan and execute a series of lessons within a school, modifying his theory with *respect to constraints* effected by the school and by his own personality and skills.

3 He is *helped to evaluate his success* in choosing appropriate objectives and methods by his tutor and the teacher in the school, and the following list is a suggested framework of attitudes to the role of the teacher and the place of Biology within the curriculum:

(a) Teaching objectives conceived only in terms of *factual knowledge* which the pupils are to acquire. Methods didactic. *Passive learning* only required although demonstration and practical work may be used. Biology seen in terms of observed phenomena only, with *no integration of Biology with other* relevant *disciplines*, e.g. physics, chemistry and mathematics.

(b) *Uncritical acceptance of curriculum reform* projects objectives with no sensitivity to local conditions or modification of the approach. Such projects used as a source of techniques without due attention being paid to their educational principles and objectives. (In most projects, integration of Biology with other disciplines is usual.)

(c) *Appropriate objectives* selected for the school and the class and attained using a *variety of active learning methods*. (NB: It is often difficult to make students aware that expert, active use of traditional methods is preferable to passive recipe-following situations which can result from inexpert use of curriculum reform projects.)

(d) Appropriate objectives and methods used in such a way that *pupils become self-disciplined*, i.e. able and willing to programme at least their own record and mode of working through required tasks, if not their own lines of investigation or the nature of the task itself.

While some progression is implied in this list, it is essential that students realise that there are situations where factors listed under (a) and (b) may be appropriate and those under (c) and (d) decidedly not! No teaching situation is ever perfect and to try to achieve or even to expect 100% success with every member of the class in every

situation is a sure way to madness. *Success is a relative term* and will be seen in quite different frames of reference by the student, the pupils, the tutor and the class teacher; one hopes, however, that the areas of agreement will overlap a great deal.

C WHAT IS TO BE ASSESSED

1 The efficiency of a student's communication:

- *the adoption of the appropriate vocabulary*, verbal, visual and social
- *the adoption of the appropriate teaching style*, e.g.:
  - (i) appropriate previous preparation by class
  - (ii) correct assessment of previous knowledge relevant to the lesson
  - (iii) introduction: with appropriate level and form of motivation with clearly set out intentions
  - (iv) establishment of facts and concepts by:
    - lecture, unstructured, no feedback
    - lecture, using questioning, to and from class
    - lecture, with pre-test questionnaire and discussion
    - demonstration, by teacher
    - demonstration, pupil-assisted
    - demonstration, pupil-designed
    - investigation, recipe-following
    - investigation, problem-solving
    - investigation, pupil-motivated, may need acquisition of new techniques and skills
    - visual aids, used instead of the teacher
    - visual aids, used by teacher, class passive
    - visual aids, active involvement of class
    - discussion, teacher leads
    - discussion, teacher controls
    - discussion, in small groups, reporting conclusions back to whole class
  - (v) consolidation:
    - verbal or written questions
    - visual methods, e.g. models made by class
    - reinforcement, other than by simple recall
    - by practical application
    - by synthesis, e.g. use of examination questions
  - (vi) record of work:
    - dictation, gap-filling
    - structured by teacher on board or worksheet
    - common record by discussion, corrected by teacher and class

(The work of compiling the record is divided and given to subgroups of the class. They then present their contributions for criticism by the other pupils as well as the teacher, before the final and complete record is compiled from the work of the whole class.)

    - individual record
  - (vii) whole class teaching, individual or group work
  - (viii) lesson analysis sheets are of reasonable standard

AND IN ADDITION

2 The student's skill in using a range of teaching hardware.

3 Possibly software production.

4 Rating on a four-point scale the effect the student has had on the motivational level of the class:

(i) he has intelligent and active co-operation of the class
(ii) he has evoked a good response to discussion or practical evidence, allowing the lesson to be built up effectively
(iii) class passively receptive
(iv) class antagonistic and antipathetic

5 Ability to modify from feedback.

NB: It is beyond the powers of most students to shift a class from antagonism to co-operation, hence this rating must take into account the status quo of the class.

D THE FOLLOWING CHECKLIST OF WHAT MAY BE ASSESSED IN SOME SPECIAL SITUATIONS is to help to make the student aware of the problems with which he may be confronted rather than a scheme of assessment for all students in all schools.

1 *Teaching least able pupils.* Assessed under five headings:

- class motivation, both form and strength
- appropriateness of pace of learning accommodated
- number and type of opportunities for success offered to the pupil
- critical use of behavioural objectives*
- critical use of method, reinforcement and evaluation

2 *Teaching pupils in a laboratory for the first time.* Assessed under four headings:

- the appropriateness of his vocabulary
- skill in motivating pupils
- skill at organising the class and controlling the pupils' behaviour
- selection of behavioural objectives for the class

3 *Teaching a sixth form.* Students should be able to use a variety of methods selected from the following:

(i) a variety of teaching techniques
(ii) integration of relevant practical with theory
(iii) teacher-structured work at individual pace, integrating use of all aids (textbooks, visuals, practicals), teacher is used as a tutor
(iv) pupil-structured work at individual pace

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* The two most common complaints of University teachers is that students fresh from sixth forms are unable to take notes other than from dictation, and are unable to organise their own work without constant reminders.

4 *A revision lesson.* Assessed on these factors:

(i) factual gaps diagnosed only
(ii) pupils allowed to recognise but not recall what they are supposed to have learned
(iii) pupils' recall exercised, verbally or passively
(iv) pupils' recall achieved by a variety of activities demanding involvement
(v) pupils synthesise knowledge (e.g. answer an O level question) as well as recalling it in discrete parts

5 *Museum visits or field work, etc.* Assessed under three headings:

- the extent to which the pupils' work is integrated with their course
- the extent to which behavioural objectives are incorporated
- the extent to which the pupils are actively involved in learning

6 *Team teaching.* Students should be able to select and use the appropriate techniques:

(i) main motivating/introductory session followed by group work or discussion
(ii) individual programmes constructed by team who then act as tutors to group
(iii) combinations of (i) and (ii)
(iv) interdisciplinary co-operation, but taught by individual teachers

7 *Using appropriate methods of assessment for himself and his pupils.*

Appendix A2

ASSESSMENT OF FINAL TEACHING PRACTICE

What restraints are applied by the school? List any which are not covered by the "does not apply" column.

Block in your own assessment in these columns and from the result, grade yourself.

			A	B	C	D	E	DNA
1	Data retrieval	effort						
		efficiency						
2	Pace of lessons							
3	Analysis	given method						
		own method						
4	Concepts							
5	Problem solving							
6	Programming							
7	Integration	of other sciences						
		of other disciplines						
8	Previous preparation - state methods used							
9	Was vocabulary appropriate	verbally						
		mathematically						
		visually						
		socially						
10	Was knowledge assumed correctly assessed?							
11	What kinds of extrinsic motivation were used? List them here, and assess their effectiveness.							
12	Rate yourself on the use of these methods:							
	lecture, unstructured, no feedback							
	lecture with Socratic questioning							
	lecture with questionnaire and discussion							
	teacher demonstration							
	pupil assisted demonstration							
	pupil demonstration							
	investigation, recipe following							
	investigation, problem solving							
	pupil designed investigation							
	small group work							
	project work							
	circus							
	individual work programmes							
	use of visual aids, active to passive							
	discussion, teacher leads							
	discussion, teacher controls (or not!)							
	small group discussion							
	individual tutorial							

		A	B	C	D	E	DNA
13	Rate yourself on these methods of consolidation:						
	verbal or written questions						
	visual methods, e.g. models						
	practical application						
	synthesis, e.g. problem or exam question						
14	Method of recording work:						
	dictation, gap filling						
	structured by teacher on board or worksheet						
	common record by class discussion, teacher corrected and class corrected						
	individual record, organised by pupil						
15	Teaching least able pupils						
16	Teaching pupils in a laboratory for the first time						
17	Teaching VI form. State methods used and methods preferred:						
18	Revision lessons. State methods employed and methods preferred:						
19	Museum and zoo visits						
20	Field work						
21	Team teaching						
22	Which of the following behavioural objectives did you manage to include in spite of all obstacles?						
	realistic, open minded, accurate observation						
	experimental design — criticism only						
	with help						
	pupils unaided effort						
	deduction and induction						
	hypothesis formation — mostly guessing						
	with help						
	concrete only						
	pupils unaided effort						
	abstract						
	techniques, manual dexterity						
	improving verbal ability						
	literacy						
	numeracy						
	social skills						
	self discipline and responsibility of pupils						

	A	B	C	D	E	DNA
23 List the methods of evaluation you have used and your efficiency in them:						

FINAL GRADE:

Signed:

So you don't like this questionnaire: redesigned versions welcome.

Appendix B

Why do I wish to teach?

NB: This is an informal expression of the attitudes found in many students and is not supposed to be a fully informative model either of information or of literary expression. Dorothy Dallas

"Those who can, do: those who can't, teach." Shaw's dictum provokes howls of such fury from educational establishments that there is likely to be a good deal of truth in it. There are many instances known to most of us in which it is only too apparent, and indeed to many of my contemporaries teaching is a second-choice profession. This in no way reflects on their teaching ability, however, and the whole thing is tied up with one's attitude to a job. If one accepts one's status in the world realistically and is prepared to make a good attempt at whatever job one accepts, it is a very different situation from that of those who find themselves wanting something of a higher status than teaching and yet cannot acquire it. I suppose everyone would like certain things out of life, and one's job selection, in so far that one has any choice in the matter, is in most cases a compromise with these.

So firstly, what limitations are acting on me as far as satisfying jobs are concerned? Apart from the financial necessity there is the nature of my subject (Biology), especially as it is associated with a lack of chemistry and biochemistry, that further limits the field. 'Pure' Biology with an ecological bias is still not a criterion for many jobs and research is limited (a) by the fact that it is difficult to get posts and grants and (b) that I don't feel any inclination towards it. As for other jobs that I would be theoretically qualified for, I do not feel a desire to limit myself to a nine-to-five office job and to give up my independence (?) by joining the commuter crowd. A museum job might be interesting, but I would not really like this to be purely in the field of 'natural history'.

Secondly, what do I consider to be my motives for teaching? I would like to work with young people whose minds are still concerned with enquiry and delight in knowledge. In such an atmosphere I hope it will be easier to keep my own mind more alert and receptive. But, more important, it is because my own school education was lacking in many ways and paradoxically so gainful in others (e.g. field trips) that I wish to help others where I can see I might have benefitted myself. Although it sounds patronising, I would like to be socially useful.

I regard Biology (with due respect for the artificiality of subject boundaries) and associated natural sciences as having special importance in the understanding of Man and his position in the Universe. I feel, especially with increasing interest in environmental principles, that this will become increasingly recognised. Not that I believe in one subject being more important that another, but I feel that Biology has a tremendous amount to offer in moral education and should also be much more closely linked with other disciplines, particularly with the Arts. In fact I regard the division of the Arts and Sciences as essentially non-existent.

Teaching also offers me a situation satisfying to my academic pretensions. It

could allow me to develop in a way I consider very important for myself, i.e. it will provide the necessity to plan and control work, will make me be self-disciplined and train me for further opportunities for study in a variety of directions. For a start, "one never truly learns a subject until one has to teach it". That will be an invaluable grounding for furthering my seekings into knowledge, truth and beauty. Is this a sublimation of the instinct to start a family? Probably something to do with it anyway! I do realise, I think, that to some extent my wish to work with children and young people is to give vent to my instincts of parental domination, which as long as it is recognised need not be a bad thing - it can be directed.

Thirdly, what misgivings have I concerning teaching? There is the question of entering a system I'm not at all sure I feel I could support, but then I do feel that society is best changed from within. Then there is the problem as to whether I feel a reason I wish to teach is to give security to my ego. Security does enter into it, no doubt, I do wish to have a nice, secure job, especially with long holidays. But as to promoting my ego at the expense of others (for example, in holding a captive audience of *young* people because in an adult world I could not do so) possibly there is something in it; I hope not much. The only other aspect I sometimes think might be limiting is to do with the responsibility, i.e. whether I am suited to putting things over in such a way as to be constructively helpful to others. I suppose time will tell.

Appendix C

Biology method (King's College London, 1970)

(Adapted from Dr Clarke, Institute of Education).

CHECKLIST OF SIMPLE LABORATORY SKILLS Name:

Please indicate in which section you would like instruction.

A Glass work

1 Cutting glass tubing and glass rod
2 Rounding of cut edges in Bunsen flame. (Of what use is an asbestos mat)
3 Inserting a nichrome wire into a glass rod to make an inoculating loop
4 Bending glass tubing - right angled, obtuse, acute
5 Making a dropper pipette and calibrating it
6 Sealing one end of a glass tube
7 Inserting a glass tube into a rubber bung or cork
8 Distinguishing between soft (soda) glass and hard (boro silicate) glass and knowing their differential use
9 Joining pieces of apparatus using rubber connections
10 Cleaning glassware stained with, e.g., Fehlings solution
11 Cutting a microscope slide to fit into a slide carrier on a 35mm projector

B Miscellaneous

1 Using a cork borer
2 Inserting a thermometer into a bung through a glass tube
3 Changing a plug on a piece of electrical apparatus - using a wire stripper
4 Simple soldering
5 Plugging up leaking aquarium tanks
6 Use of metal snips and wire bending
7 Cleaning a microscope, e.g. blood off the high power

C Visual aids

1 Using the photocopier to make a file of transparencies
2 Making a large professional poster, letraset, layout, and correct angles subtended to the myopic eye
3 Model (apart from glowing skulls, etc) making
4 Film making
5 Preparing a Gestetner stencil, Banda making
6 Use of Galetafax scanner

Add any others which spring to mind:

Case Study II

A Course for Teachers in General Medical Practice

I Preface

1 Background to the course

After qualifying, a doctor can learn about general practice through a kind of apprenticeship. He or she can be attached to a practice and the practitioner takes on the role of a trainer.

Vocational training in general practice has been the focus of increasing attention in medical education in recent years. In October 1972 a working party of the Royal College of General Practitioners published *The Future General Practitioner - Learning and Teaching*, which draws together much of the current literature and suggests guidelines for future development. Little investigation has been made, though, of the design and evaluation of courses for those GPs who act as trainers doing most of the actual teaching in general practice (but see Byrne, Freeman, and M'Comisky, 1970; Byrne, 1971; Morrison and Cameron-Jones, 1972). In fact, there are very few courses at present in Britain so that when the Royal College of General Practitioners in conjunction with the British Postgraduate Medical Federation began their first course in November 1970, in which traditional methods of teaching were not considered the most appropriate, it was suggested that a research project should be set up (Cox and Kontiainen 1973, 1974). This would not only look at the general progress of the course, but should develop methods of evaluation which would help such courses to monitor their activities and respond more effectively to the needs of the course members and general practice teaching.

The course presented below arose from that project. The preceding Dallas/Piper study was influential in this analysis. In some sections of the analysis the objectives are fairly close to specific learning objectives and might be used directly in relation to specific sessions with little further elaboration. Other sections, however, are much too general to be of much help for detailed planning. 'The ability to use' a particular teaching technique such as the lecture 'effectively in relation to different objectives' would need to be analysed into more particular 'enabling' objectives such as creating and maintaining interest, organisation, the use of aids, voice production etc. In this case a fairly standard 'package' of objectives might be easily modified to fit the needs of the course, and might be left almost entirely to 'specialists' responsible for particular sessions, but if these are not present whenever the topic arises, the detailed objectives should be available and used if they can contribute to a better balanced and more comprehensive coverage of what the course members might be expected to achieve.

This particular analysis then cannot be used as a blueprint for a course. It says very little, explicitly at least, about the logic of the subject or the most appropriate sequencing for the best learning strategy, but we believe it does set out the basic data about the course which is necessary for making these decisions.

2 The structure of the analysis

2.1 Main categories. All courses are multi-dimensional and the dimensions are related in complex ways; any organisation must therefore be a somewhat arbitrary simplification even though it may still appear highly complex. Occasionally repetition can only be avoided by making the organisation more arbitrary and a compromise is often necessary. Nevertheless, the end result should present the course organiser with a much more coherent basis for planning the course.

This analysis goes further towards a course plan than many statements of objectives. Not only are activities related to objectives together with an outline of what is to be assessed and by what methods, but assumptions and underlying values and general orientation of the approach are summarised. These are by no means exhaustive but they serve as a guide and perhaps a warning about what to expect. Some of the objectives can be understood better if they are seen in relation to these values. The general assumptions and values are not repeated before each aspect although they are often relevant.

This analysis begins with a general summary of the approach (*first aspect*) so that the other aspects can be seen from this overall viewpoint. These are nearer to 'topics' than many other statements of objectives in order to make it closer to a course plan and so that knowledge, skill and attitude components of the course could be seen more clearly in relation to particular aspects of the course and not as having the appearance of an independent existence. There was a tendency to see the *second aspect* 'approach to the content of the trainee year' as very similar to an account of the trainee year itself, but it is, in fact, a 'course design' section although some problems generally associated with this do not occur when planning for individual trainees.

The *third aspect* 'teaching and management of learning' is a particularly broad one and, although it might have been broken into a number of aspects, it seemed closer in the reality of the course to treat it as a whole. One problem with broad sections is that some aspects may not get so much emphasis as they would in a separate section. The biology teachers' analysis made 'insight on own performance' a separate aspect. We felt that such insight would be a very integral part of teaching and the management of learning and have put it in that aspect, but this may have the unintended consequence of suggesting it is a less significant feature.

The *fourth aspect* concerns the organisation of the practice and community setting for teaching - making the most effective use of the resources of both the practice and the wider community.

2.2 Objectives, activities and assessment. Within 'aspects' there is a preliminary section in which the assumptions and values are set out.

2.2.1 Objectives column. Objectives are separated into attitudes, knowledge, and skills and there is a different layout for the attitude objectives. It was felt that 'negative' attitudes were more important than misinformation or 'wrong' skills and so we have incorporated the 'away from - towards' format. This may lead readers to expect them to be symmetrical but this can cause undue repetition and we have not attempted to make each attitude objective defined in terms of two opposite poles.

2.2.2 Activities column. The relationship between objectives and methods of teaching and learning is not as yet very well understood despite a considerable accumulation of research so that the links between particular objectives and activities are often suggestions rather than established recommendations. Even within the limitations of our knowledge, however, it is clear that certain types of activity are more suitable for some objectives than others, especially if the objectives are divided into attitude, skill and knowledge components. It is unrealistic, however, to always look for discrete activities - many can serve a range of objectives but if it is not clear just what that range is, their potential may not be realised. This analysis as it stands is only rather a crude checklist to be considered when looking for ways of achieving objectives.

2.2.3 Assessment columns. The two assessment columns, 'what is to be assessed' and 'methods of assessment', reveal some problems which may not be encountered by many other courses. The former is not redundant, partly because many of our objectives are not behavioural or instructional in Eisner's sense* and partly because our opportunities for assessment are limited. There is no certificate awarded and, although course members work hard and produce documents and reports, these are usually group products. Conventional essays, tests and examinations would be too intrusive. The time limits, moreover, prevent the wide use of individual evaluation of teaching. The assessment of teaching skills are, therefore, mainly limited to group comments on various examples of teaching. But not all the limitations of the assessments that are actually used can be attributed to the particular constraints of the course. It was not until the objectives were set out in details that it became clear that we were attempting so much that was not adequately assessed: analyses of this type do not very easily take account of priorities, but it did draw our attention to the need for re-thinking so that what actually happens might be nearer to the ideals expressed in such analyses.

3 Discussion

We hope that this analysis will be useful to all who are concerned with planning new courses or re-organising existing courses. Although it is not radically different from previous analyses it does attempt to integrate a wider range of issues and relate them to the context in which the course must operate, even though it does not attempt to look at the dynamic aspects of course activities or administration. Its relationship to the timetable is not discussed, but it is suggested that this type of analysis can make it easier to integrate both the detailed planning of particular sessions and the general administration of courses into the main aims of the course.

For those who are concerned with general practice teaching, we would hope that the content as well as the form will suggest a different range of possibilities which will add to their own thinking in the area.

This is certainly not a 'final' version and experience of the development of the course over the last three years has made it clear that objectives arise not only from thinking about what courses are designed to achieve

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* Eisner E W, 1969, *ibid*

but from the way they actually run; objectives are constantly modified and extended from interaction with the process of teaching and learning.

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II

The Document produced by Roy Cox and Seppo Kontianen
in co-operation with Ruth Beard, Peter Higgins
and Nicolas Rea

AN ANALYSIS OF COURSE OBJECTIVES, ACTIVITIES AND ASSESSMENT: A COURSE FOR TEACHERS IN GENERAL MEDICAL PRACTICE

ASPECT 1: Summary of approach to general practice teaching - role of trainer, role of trainee

This first aspect gives an overall summary of the approach to general practice teaching on which the course is based. It is meant to be comprehensive and to give a general framework of the detailed specification, which is set out in aspects 2, 3 and 4.

1.1 Assumptions

1 Trainers' primary vocation not teaching but general practice.
2 Prior experience of being taught mainly didactic and authoritarian.
3 Prior experience of teaching, if any, mainly limiced to unstructured apprentice supervision.
4 Primary teaching interest is with trainees but some concerned with students and other social and medical workers.
5 Trainers will have differing expectations of the course, differing attitudes to teaching and general practice and differing capacity for change.
6 Most trainers uncertain of their roles as teachers.

1.2 Values and general orientation of the course

1 Many possible teaching roles for trainers.
2 Practical rather than theoretical.
3 Active participation.
4 Not didactic.
5 Enjoyable experience.
6 Emphasis on emotional and social aspects of general practice medicine.
7 High standards of special knowledge and skills needed for efficient general practice.
8 Importance of analysing the roles and objectives of general practice in relation to planning the programme for the trainee year.
9 Factual knowledge important but not the main emphasis of the course.
10 Emphasis on group work as the main teaching/learning activity of the course.
11 Wide opportunity for course members to learn from communicating with each other.

1.3 AIMS AND OBJECTIVES ATTITUDES to be encouraged by course KNOWLEDGE to be learned on course SKILLS to be learned on course	ACTIVITIES General activities for attitudes, knowledge and skills which apply to all or most objectives are in italics. Those which apply to particular objectives only are in small type	WHAT IS TO BE ASSESSED	METHODS OF ASSESSMENT (General methods in italics - particular in small type)
ATTITUDES <u>Away from:</u> 1 Seeing trainer's role *primarily* as employer (concerned with satisfactory performance of routine duties) or colleague (with little responsibility for teaching) or as subject expert (whose role is to tell what he knows) <u>Towards:</u> 2 Seeing trainer's role as involving: a concern for teaching as an activity involving sensitivity to interpersonal relations and emotional, social and intellectual needs and abilities	*Residential weekend and the entire course. Lectures from staff and visitors, group discussion and reporting. Demonstrations. Role play. Film, tapes etc. Projects. Syndicates.* (details under aspects 2, 3 and 4)	How far the course has influenced attitudes, knowledge and skills (details under aspects 2, 3 and 4)	*Attitude questionnaires. Interviews. Practical teaching and comments on others' teaching. Observation of group work and discussion. Group and individual reports.* (details under 2, 3 and 4)

3 Acceptance of the need to plan and organise a comprehensive programme for the trainee and to monitor its progress throughout			
4 A concern for flexible use of varied techniques			
5. A willingness to experiment and change in response to new situations			
6 A willingness to see general practice teaching within the broad context of society's changing needs and those of individual patients			
7 Concern for trainee's views of general practice as a future career			
KNOWLEDGE			
8 Knowledge of educational objectives, individual and group behaviour, methods of teaching, management of learning, organisation of practice and community health service, and assessment in the context of general practice education			

SKILLS 9 Skill in analysing objectives, selecting and using suitable and varied teaching and assessment methods 10 Ability to develop an efficient practice and community organisation for teaching and learning 11. Ability to develop self-awareness and skill in interpersonal relationships and apply these to the role of trainer			

ASPECT 2: Approach to content of trainee year

Aspect 2 concerns the *approach* to the content of the trainee year, it is not meant to give an account of what that content should be; nor is it concerned with how the content should be organised and learned by the trainee - this is in aspect 3; nor with how the practice itself and other local community facilities should be developed and used - this is in aspect 4. Plainly the specification of objectives, the analysis of needs and the involvement of the trainee in this activity is not completely separate from questions of learning, teaching and curriculum or programme planning but there are enough differences to make it a separate aspect of the course.

2.1 Assumptions

1 Course members very varied in experience and degree to which they have thought about content.
2 Probably little systematic analysis.

2.2 Values and general orientation of the course

1 Need for both comprehensive general schema of objectives and tailoring to fit individual needs.

2.3 AIMS AND OBJECTIVES	2.4 ACTIVITIES	2.5 WHAT IS TO BE ASSESSED	2.6 METHODS OF ASSESSMENT
ATTITUDES Away from: 1 Regarding 'objectives' merely as a list of subject headings 2 Belief in *ad hoc* exposure instead of planning 3 Regarding own ideas, patients and practices as entirely adequate 4 Limited horizon of role of general practice 5 Belief that using same approach for all trainees is adequate Towards: 6 Interest in analysing with the trainee their intellectual, social and emotional needs and objectives and willingness to do so 7 Readiness to involve trainees in planning and defining objectives of the trainee year 8 Willingness to develop and keep up to date medical knowledge and skills essential to good teaching	*Reading examples of objectives, short lectures, group discussion with trainees, group formulation of objectives, individual fitting to needs of own trainee - case studies*	How far the course has influenced members in relation to attitude objectives	*Attitude questionnaires. Interviews. Observation.*

KNOWLEDGE 9 Knowledge of: existing specifications of content 10 Methods of selection and organisation of content 11 Knowledge, skills and attitudes necessary for general practice but not previously acquired 12 Local facilities - hospital, local authorities, health and social services 13 Resources and limitations of own practice 14 New developments in medicine		No direct assessment of knowledge (only as indicated in group and individual reports and in discussion)	Written reports of new or amended objectives. Observation of group discussion
SKILLS 15 Ability to make specific analyses of the various tasks of the general practitioner as an aid to teaching 16 Ability to formulate, select and criticise objectives (for trainees in general)	Group task analyses	Analysing medical tasks Formulation and criticism of general objectives fitting to individual needs	Observation of group discussion. Written group and individual reports.

17 To select objectives for individual trainee's needs.			
18 Ability to liaise with colleagues in medical and non-medical areas to broaden the scope of the content of the trainee year	Interdisciplinary group discussion	Ability to liaise with colleagues	Assessed only in relation to trainer's ability to discuss liaison issues and through observation and assessment of interdisciplinary group discussion

ASPECT 3: Teaching and management of learning

This aspect concerns the 'how' of teaching and learning with emphasis on the quality of the trainer/trainee interaction, becoming a more skilful practitioner in teaching and a more effective manager of learning. Management of learning will involve the organisation of the practice and the local resources for learning but these are treated separately in aspect 4.

The lack of any specification of the scope of knowledge expected of course members is particularly apparent here with the long list of topics in 11 to 13. This section functions here simply as a checklist for further detailed course planning. Other sections go into more detail and are more closely related to the specifications needed for particular aspects of the course.

3.1 Assumptions

See aspects 1 and 2.

1 Tendency for many (but not all) members to leave trainees to pick up what they can from occasional discussions.
2 Tendency to tell them the right answers.
3 Little knowledge of education and educational psychology.

3.2 Values and general orientation of the course

1 An active and directive policy of encouraging the trainee to ask the right questions, explore own and others' assumptions and needs, to test their adequacy and come to own conclusions within a comprehensive framework of the GP's role.
2 Stress on importance of feedback for both trainer and trainee.
3 Fostering independence so that the trainee will continue education when the trainee year is over.

3.2 AIMS AND OBJECTIVES	3.4 ACTIVITIES	3.5 WHAT IS TO BE ASSESSED	3.6 METHODS OF ASSESSMENT
ATTITUDES Away from:			
1 Authoritarian and rigid attitudes	*Reading lectures from course members, staff and visitors. Group discussions and reporting. Demonstrations, role play, films, tapes, projects, syndicates*	How far the course has influenced members in relation to attitude objectives	*Attitude questionnaires. Observation. Written comment on teaching*
2 Belief in the adequacy of small range of teaching techniques			
3 Stereotyped view of trainee's motivation, expectations, style of working and interests			
4 Regarding trainee as having a passive role			
Towards:			
5 Non-authoritarian flexible attitudes			
6 Wanting to learn, apply and develop a wide range of techniques			
7 Valuing independent activity of trainees and involvement of them in planning trainee year	Group discussion and role play *with trainees*		

8 Wanting to create a positive, open, trusting, free and self-critical teaching and learning atmosphere 9 Wanting insight into trainee's expectations, motivation and performance 10 Wanting insight into own motivation and performance			
KNOWLEDGE 11 *Knowledge of principles of learning* - communication problems - emotional aspects - feedback, motivation, reward and punishment, active and passive learning etc 12 *Knowledge of teaching/learning techniques* - lecturing - use of aids. Tutorial - teaching/demonstrating on specific cases (a) medical aspects (b) interviewing aspects - small group discussion - case studies and reports - syndicate work - projects 13 *Knowledge of evaluation methods:* observation techniques, interviewing, reports and questionnaires	Emphasis on derivation of principles from practical activities	Not assessed directly. See column 3.6	Expressed in attitudes and skills and in course members' statements and questions, discussions, interviews, reports and general feedback activities during the course

SKILLS			
14 Ability to use variety of techniques (mentioned in 12 above) effectively in relation to different objectives	Preparation, delivery and criticism of short talks and case studies	Ability to prepare and deliver a lecture using appropriate aids. Ability to teach from consultations both in terms of (a) medical knowledge (b) interviewing consultation techniques	See above (early and late in the course). Comparison of trainers' comments and criticisms of recorded teaching: lectures, role play, group leadership, evaluation of group self-criticism and analysis. No direct evaluation possible with own trainee, except through interview
15 Ability to cope effectively with a wide range of teaching problems associated with (a) different types of illness and (b) different types of patient. To include two aspects - sensitivity of trainee to doctor/patient relationships and medical treatment. Areas where particular difficulties may be experienced due to the nature of the problem, patient/trainer/trainee relationships, or inadequate coverage in medical school. (a) *Social-behavioural problems*, eg adolescence, delinquency, drug dependency, alcoholism; liaison with social workers, health visitors etc	Role play (of consultation and tutorials) acting, observation and discussion. Group discussion, acting as group leader. Observation of groups. Syndicate work reporting. Project work reporting. Role play within each of the main areas. Group discussion of teaching problems in relation to all aspects	Ability to prepare and give tutorials. Ability to run and participate in group sessions. Ability to guide project work	Indications from attitude and teaching skill evaluations and from interviews

(b) *Psycho-sexual problems*, impotence/frigidity, homosexuality, marital problems, contraception (c) *Management of chronic and terminal illness* geriatrics, bereavement (d) *psychiatric illness* Management of serious psychiatric illness, hospitalisation voluntary and compulsory, recognition of psychiatric illness presented with organic symptoms (e) *Doctor-patient and trainer-trainee communication* the emotional component of doctor-patient and trainer-trainee relationship, patients hostility and fear of doctors, cultural differences			
16 Ability to interact and develop an understanding relationship with the trainee which will make the teaching/learning process most effective	Role play, group discussions with trainees about their role and relationships within the practice	Quality of interaction with trainee	Questionnaire. Observation of role play and discussion. Course members' ratings of role play behaviour
17 Ability to develop and use insight into own motivations and performance to improve teaching	Group discussions on motivation and self-knowledge	Level of insight into own behaviour and application to learning	

18 Ability to fit general programme to individual needs 19 Ability to *select* appropriate techniques for particular objectives 20 Ability to organise objectives and methods into a meaningful programme for the trainee year with options to take account of individual differences	Group development of trainee programme. Group discussion of problems to fit. Trainers and trainers devising individual programmes as group exercises. Case studies of programmes presented by trainers who have trainees	Ability to plan general programme for trainees. Ability to fit general programme to individual needs	Evaluation of group reports on trainee programme. Evaluation of group discussion of 'fit' and individual reports for specific trainees
21 Ability to liaise with colleagues in medical and non-medical areas to arrange suitable exchanges, placements, follow-up of patients etc	Interdisciplinary group discussions	Ability to liaise with colleagues	Observation of group discussions as examples of liaisons and discussion of liaison issues
22 Ability to design and use a variety of assessment methods to analyse and improve both teaching and learning 23 Ability to integrate assessment methods into comprehensive meaningful design	Group development of assessment design. Practice in evaluating role play, group work, reports, and the trainers course itself. Practice in assessment; interviewing	Ability to design and use a variety of assessment methods. Observation techniques. Interviewing (viva). Reports. Questionnaires. Ability to integrate different methods	Assessment of group reports on evaluation design. Assessment of course members' evaluation of role play etc. Assessment of course members' evaluation of trainers course

ASPECT 4: Organisation of practice and community setting for teaching

The last aspect is more concerned with the teaching/learning environment - developing an appropriate setting in which the trainee can make effective use of the resources of both the practice and the wider community.

4.1 Assumptions

1 Trainers rely excessively on own practice as the basis for all teaching.
2 Incomplete or inadequate links with Local Authority, hospital and other resources for organising joint teaching of trainees.
3 Records not well adapted to teaching.

4.2 Values and general orientation of the course

1 Recognition of teaching role of all members of the practice teams.
2 Importance of good communication within the practice.
3 Importance of good record keeping for teaching.
4 Need for organisation of the practice to fit in with educational needs of trainee - both inside (in service) and outside the practice.

4.3 5 Encouragement of ongoing research activities in the practice.
6 Need for good co-operation, preferably on a personal basis, with local hospital consultants, medical officer of health, director of social services, organisers of other services in the community and other community workers.
7 The development of activities for teaching should benefit the trainer and the practice as well as the trainee.

4.3 AIMS AND OBJECTIVES	4.4 ACTIVITIES	4.5 WHAT IS TO BE ASSESSED	4.6 METHODS OF ASSESSMENT
ATTITUDES Away from: 1 Rigid belief in only one style of practice. 2 Belief that trainee has to put up with existing practice even if facilities are inadequate 3 Denying the value of the contribution of other disciplines to the education of trainees	*Preparation of talks and discussions on topics related to practice organisation. Group work as part of development of practice organisation objectives for trainees. Project syndicate work on relevant topics as examples of general practice research. Interdisciplinary meetings eg with*	Attitudes towards organisation of practice and community setting for teaching (4.3). Trainers own practice organisation in relation to items in 4.3. Programme of work of trainees (in practices with a trainee). Individual and group research projects by	*Attitude questionnaire. Interviews. Observation of course members' contributions to group discussions, projects and individual lectures and reports. Written comment on teaching*

Towards: 4 Recognising that different styles of practice are likely to continue 5 Recognising that adaptation of practice routine and facilities may have to be made to accommodate trainees and/or students 6 Willingness to cooperate with other members of the practice staff 7 Willingness to cooperate with other organisations and individuals 8 Willingness to develop practice research activities and record system	(continued) *health visitors, social workers, hospital consultants and junior staff*	(continued) course members based on practice activities	
KNOWLEDGE 9 Aspects of practice organisation that should be demonstrated especially communication and cooperation with para-medical workers 10 Of roles of different staff/para-medical workers 11 Buildings and equipment and standards by which to judge them		Knowledge of own practice and local community organisations and facilities as a setting for teaching in relation to general points in 4.3 K9-14	Knowledge assessed primarily from individual reports on local practice and community organisations and facilities and observation of group discussion on these

12 Availability of journals and reference books 13 Of efficient record keeping 14 Research activities useful in teaching 15 Own practice and local community organisation and facilities for teaching in relation to general points			
SKILLS			
16 Skill in organising trainees' timetable to fit practice routine allowing time for study, hospital attachments	Group discussions and case studies of timetable problems and planning	Skill in organising timetable	Analysing individual case studies and observation of discussions
17 Skill in organising practice research 18 Skill in monitoring practice activities 19 Skill in organising and using records in teaching 20 Skill in using communication and co-operation with other medical and para-medical workers in teaching	Project and syndicate work-evaluation discussion. Presentations and discussions by members and specialists - role play, tutorials. Lectures and inter-disciplinary group discussions on communication and co-operation	Skill in organising practice research Skill in monitoring practice activities. Skill in using records in teaching Skill in using communication and cooperation to improve teaching and learning	Project and syndicate reports and discussion Evaluation of role play and case presentations Evaluation of lectures, group discussions

Volume II A PLANNING SEQUENCE

The second volume presents a detailed account of a new course in the process of being designed. It takes the reader step by step through writing general and specific objectives, arranging groups of objectives which can be pursued concurrently, deciding the order in which objectives should be taken on a course, producing a timetable and planning individual classes.

The main case study is based on the first-year course (1970-72) run at the Architectural Association School of Architecture. It is a general course designed to develop competence of students to pursue their studies and to nurture a systematic yet creative approach to the solution of problems. It thus has a relevance to courses in a wide variety of disciplines.